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VOLUME XV.
NUMBER 4.

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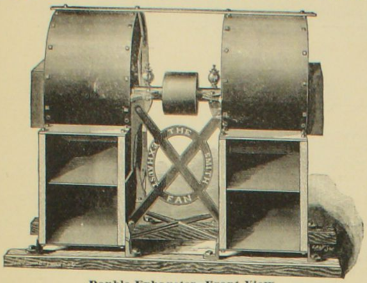

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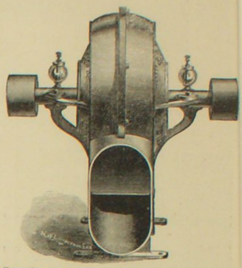

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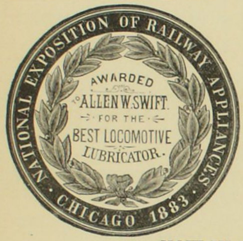

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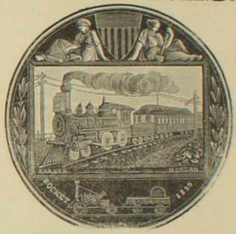

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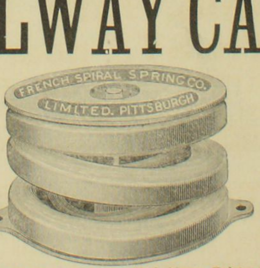

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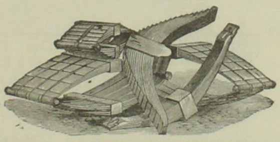

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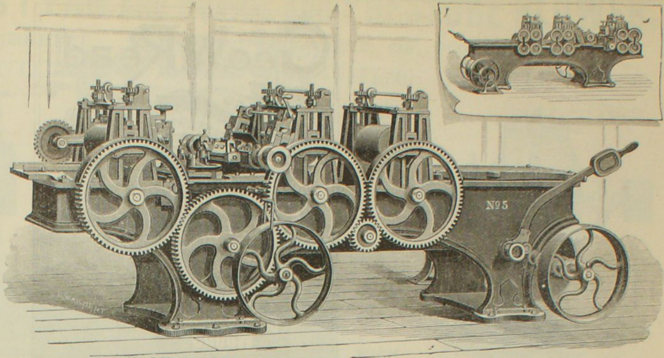

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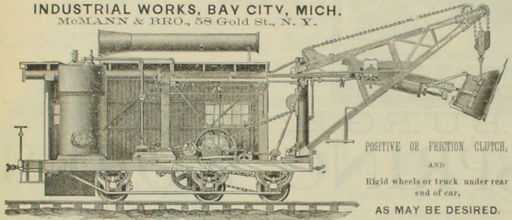

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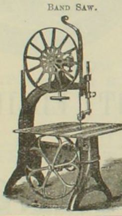

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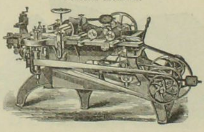

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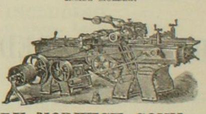

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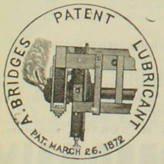

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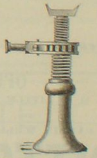

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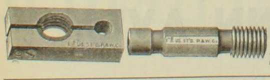

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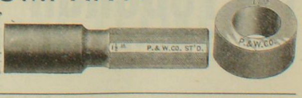

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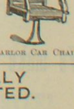

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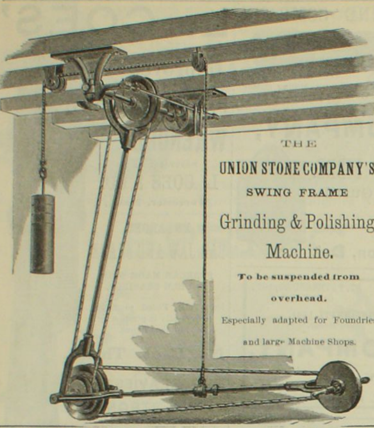

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The work is placed on the floor, bench or truck, the emery wheel is swung at will to conform to the straight or uneven surface. The wheel, being driven from a swinging countershaft, suspended by a telescopic rod with a universal joint, may be carried back and forth or swung at will; and the frame carrying the wheel being also suspended by the counterpoise weights jointed to a similar horizontal telescopic rod, makes it easy to twist the wheel over to any angle or give it any range of movement up or down. The operator can seize the handles on each side of the wheel, and carry it to any portion of the work desired. A boy can operate it. By substituting a circular "Scratch Brush" for the wheel, its value in the cleaning room of a foundry is apparent to all familiar with the old laborious hand process.

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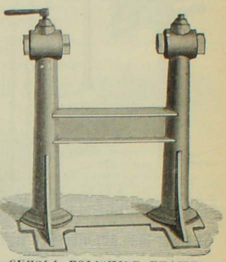

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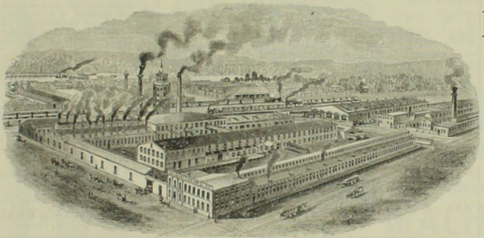

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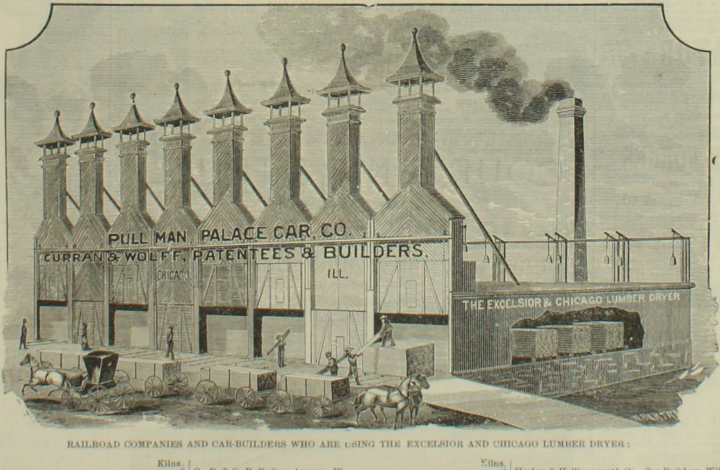

DRYING 8,000 FEET PINE LUMBER EVERY 24 HOURS.

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Norfolk & Western R. R. Co., Roanoke, Va	2	Louisville & Nashville R. R. Co., Louisville	2	Southern Car Co., Car-Builders, Knoxville, Tenn	1
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Denver & Rio Grande R. R., Denver, Col	2	Wells & French Co., Car Builders, Chicago	3	Gilbert & Bush Co., Car-Builders, Troy, N. Y	1
A. T. & S. Fe R. R., Topeka, Kan	2	Michigan Car Co., Car-Builders, Detroit, Mich	2	Ensign Mfg. Co., Car-Builders, Huntington, W. Va	3
Flint & Pere Marquette R. R. Co., Saginaw, Mich	1	Ohio Falls Car Co., Car-Builders, Jeffersonville, Ind	2	Peninsular Car Works, Car-Builders, Detroit, Mich	2
C., M. & St. Paul R. R. Co., Minneapolis, Minn	2	Barney & Smith Mfg. Co., Car-Builders, Dayton, O	4	Northern Pacific R. R., Brainerd, Minn	2
Memphis & Charleston R. R. Co., Memphis, Tenn	1	Jackson & Sharpe Co., Car-Builders, Wilmington, Del	2	R. & D. R. R., Richmond, Va	2

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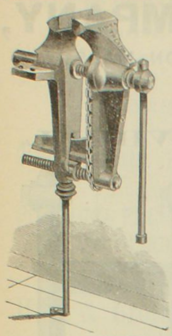

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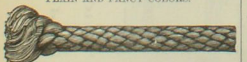

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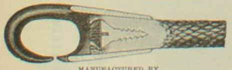

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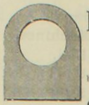

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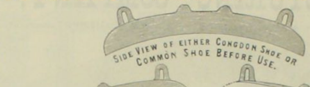

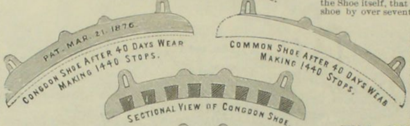

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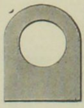

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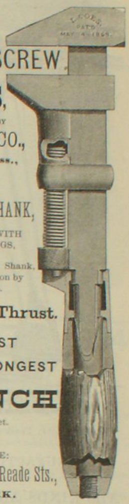

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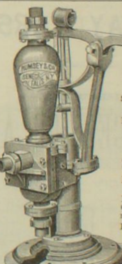

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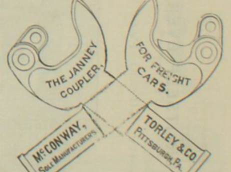

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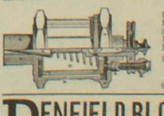

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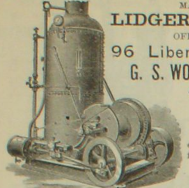

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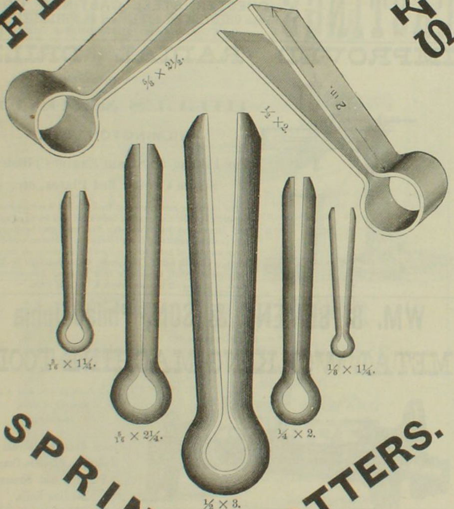

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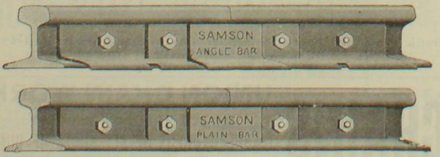

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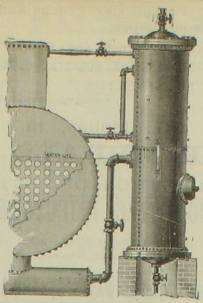

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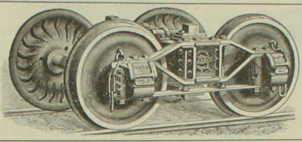

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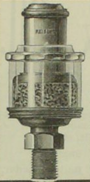

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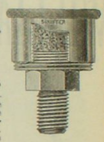

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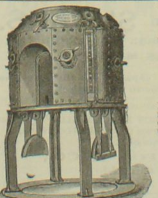

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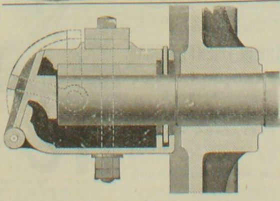

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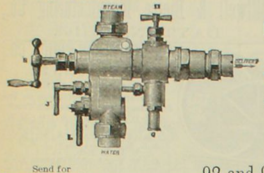

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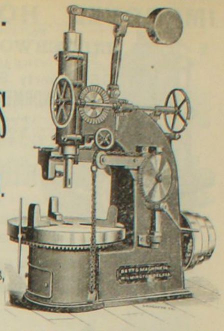

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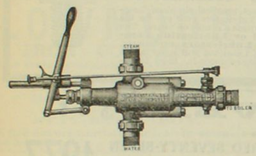

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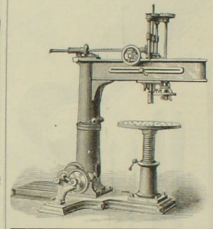

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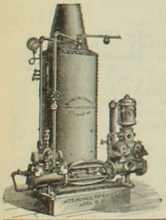

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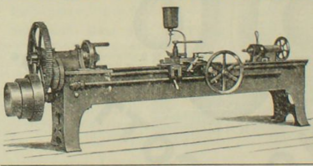

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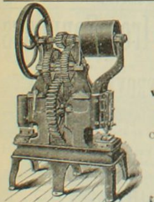

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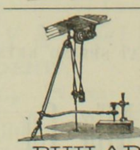

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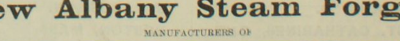

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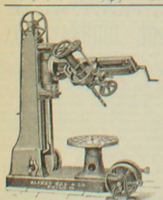

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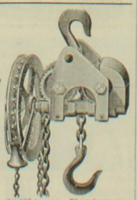

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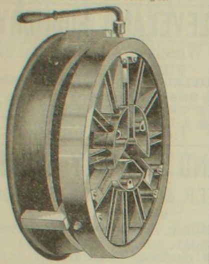
☞ The only Chucks made that use the PATENT JAW, with both face and bite of Jaws ground perfectly true. Send for Illustrated Catalogue.



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FROM 30 TO 42 INCHES.
This cut represents the Horton Car Wheel Chuck holding a car wheel in proper position for boring, the flange and tread of the wheel assuming a true position on the jaws.

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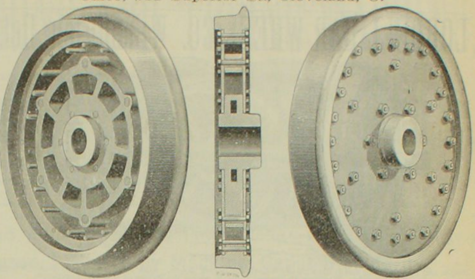

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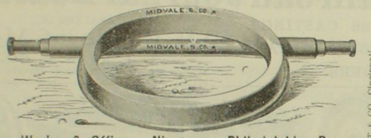

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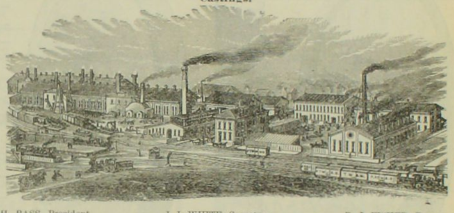

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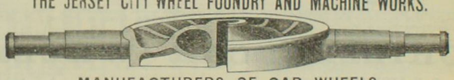

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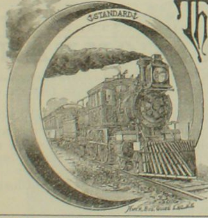

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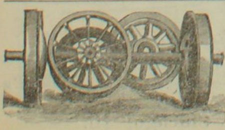

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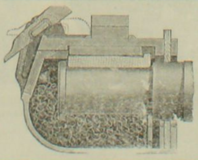

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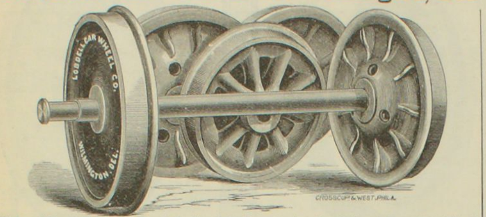

Single and Double Plate and Hollow Spoke Wheels for Steam Roads. Also, Solid and Open Plate Wheels for Street Roads. Wheels with Turned Threads, under the Patent of "W. W. Lobdell."

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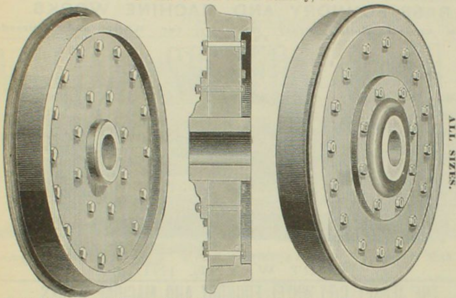

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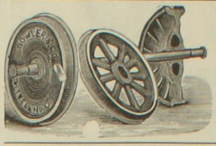
Capacity 350 Wheels per day. Wheels made by improved process. Far more durable than those made in the ordinary way.



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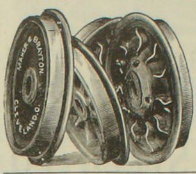

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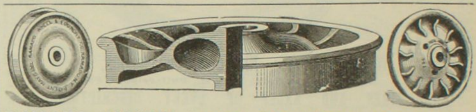

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CHILLED CAR WHEEL GRINDING COMPANY.

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Railroad officials, upon reflection, will admit it is more essential to have a machine to true up Chilled Car Wheels than a Tire Lathe for turning locomotive tires, for this reason: four or more driving wheel tires are required for one engine; a greater number of Car Wheels compose a train; hence the necessity of this invention.

The great hardness of the chilled tread has hitherto rendered the operation of turning them impracticable, owing to the great expense, which made it cheaper to frequently replace the worn wheels with new ones. To obviate these objections and reduce the cost of this process, we furnish a machine capable of making a perfect wheel at small expense.

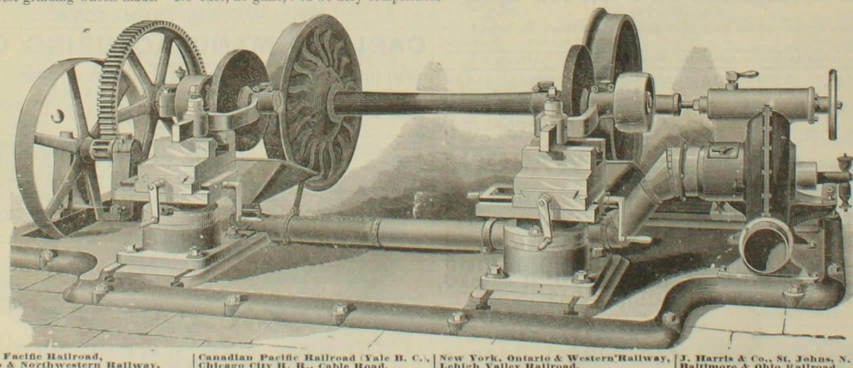
Wheels with flat places, and otherwise badly worn, that are ordinarily condemned and used for scrap iron, can be ground and fitted so as to double their original mileage. This alone makes our machine the greatest money saver ever introduced to railroads.

A sound Chilled Car Wheel trued by our method cannot be excelled by a paper or any other description of Car Wheel with steel tire.

Any person having a slight acquaintance with tools may, after five hours' instruction, become thoroughly competent to operate our machine.

Allowing all new wheels to be 3-32 inch oval, if properly fitted to axles, our machine *will* true up one pair an hour.

We manufacture expressly for use with our machine, Abrading Wheels, which, as the result of a series of experiments and long experience, we guarantee to be the best grinding wheels made. No odor, no glaze, and we defy competition.



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We are prepared to sell machines outright, or to furnish them on royalty for each pair of wheels trued. Address

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Great Economy of Time, Labor, Tools, Power and Shop Space. The Mileage of Wheels Largely Increased and Flange Wear Greatly Decreased. The Only Machine Capable of Boring the Hub and Truing the Tread of a Car Wheel at One Operation.

It will True (boring simultaneously) a chilled iron wheel in less time and deprive its tread of less of its integrity than any other Truing Machine in existence.

It will simultaneously Bore and True a steel-tired wheel *with greater rapidity and cut away less of its tread* than any known tool, or system of tools, for such purpose.

It will Bore a Chilled-Iron or Steel-tired Wheel *without truing the tread*, or True the tread *without boring;* embodying in combination, or independently, all the requisites of a Boring Mill, Chilled Car Wheel Grinding Machine and Tire Lathe.

Master Mechanics and Master Car-Builders fully appreciate the following Facts:

That wheels can not be cast to a true circle, and though registering exactly the same circumference in the rough, invariably differ in size when relieved of their peripheral irregularities.

That if circumferentially matched, rough Cast Wheels are bored and pressed upon their axle, one wheel of the pair being more oval than its fellow, and becoming the smallest of the pair, when both are reduced to a round, the best wearing surface must necessarily be cut from the chilled tread of the other, and best wheel, in order to make it conform in size to its mate.

It prepares the wheel for its axle; circumferential *admeasurement for pairing being made after wheels are bored and trued.*

It is a Simple, Compact and Reliable Machine, weighing 17,000 pounds, and occupying a floor space 10 × 8 feet.

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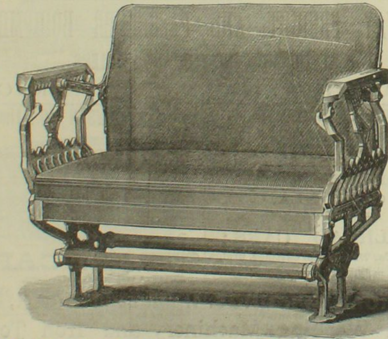

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For long routes and first-class cars the seats we are now making with SPRINGS in both seats and backs, as shown in above cut, are very popular, and are especially desirable for Summer travel, being clean, comfortable and cool.

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RATTAN SEAT AND BACK, without Springs,

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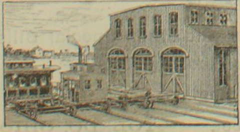

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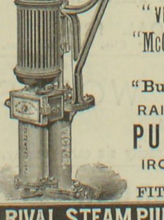

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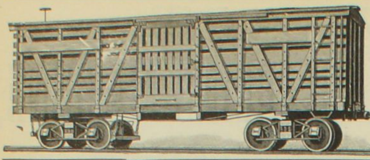

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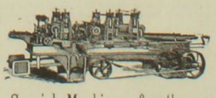

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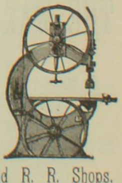

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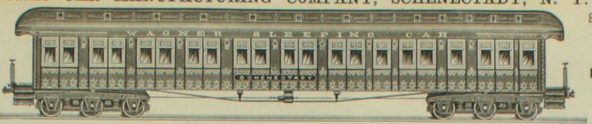

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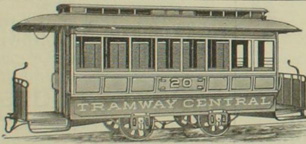

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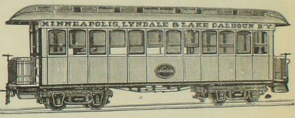

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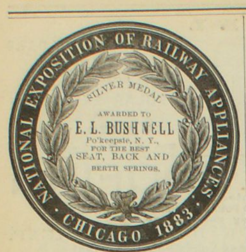

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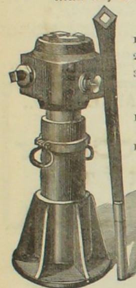

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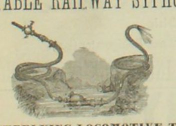

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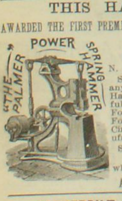

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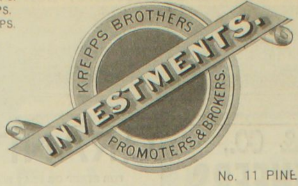

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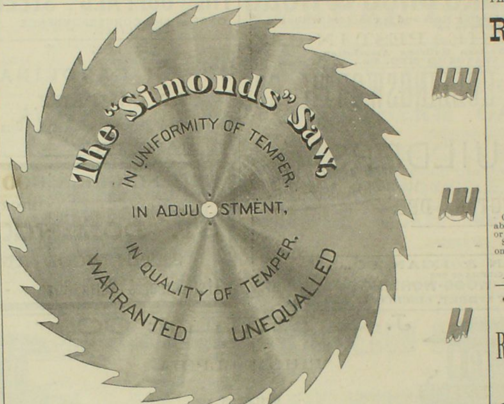

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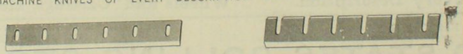

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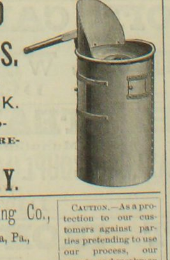

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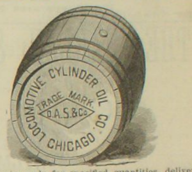

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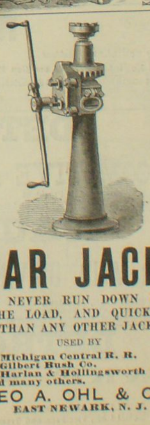

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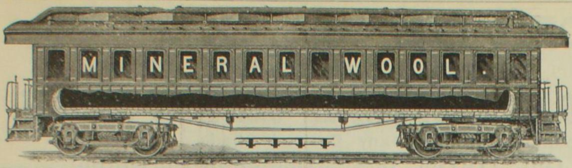

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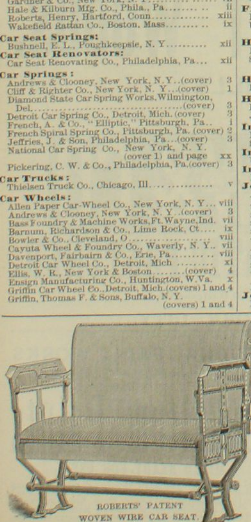

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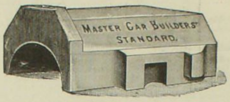

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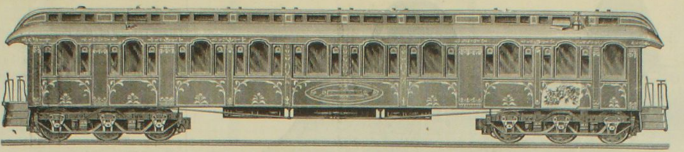


DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XV. NUMBER 4. | APRIL, 1884. | SINGLE NUMBERS, TEN CENTS, $1.00 PER ANNUM.

Miscellaneous Items.

THE Gill Car Manufacturing Co., at Columbus, O., made an assignment March 20.

THE Congdon Brake-Shoe Manufacturing Co., of Chicago, are filling an order for 67,400 brake-shoes and heads for the Union Pacific road.

A NEW steel-tired car wheel has been patented by Theodore Thurber, of Auburn, N. Y. It is to be tried on the Michigan Central road.

THE Baltimore & Ohio road is building 24 freight cars per week at its Mount Clare shops, and work will soon begin on five new standard passenger coaches.

THE Huyett & Smith Manufacturing Co., of Detroit, are rapidly introducing their machines on the Pacific coast. On the 20th ult. they shipped 13 of them to their agent in San Francisco.

IT is said that a contract has been made by the Ward Axle-Brake & Coupling Co. with a Pittsburgh syndicate of railroad men and capitalists, for equipping nineteen roilroads with the Ward brake and coupler.

THE Harlan & Hollingsworth Co. are building four passenger cars of an American pattern to be run on the road between Barcelona and Madrid, in Spain; also 25 fruit cars for the Atchison, Topeka & Santa Fe road.

MR. J. H. RAYMOND, late Secretary of the Western Railroad Association, has opened a law office in the Honoré Building, Chicago. Patents and Illinois corporations are a specialty of his practice. Mr. Raymond is an associate member of the Master Car-Builders' Association.

MR. W. W. SNOW, General Manager of the Ramapo Wheel & Foundry Co., is the patentee of a new steel-tired car wheel. It has an independent hub which can be pressed out from the body of the wheel instead of being removed from the axle, and the tire can be removed without taking the body of the wheel apart.

THE steel rails which are being put down on the Philadelphia & Atlantic City Railroad weigh 70 lbs. to the yard, and are said to be the heaviest that have ever been rolled in this country. They are made at the works of the Reading Coal & Iron Company, at Reading, Pa., and were designed by General Manager John E. Wootten.

THE following is the number of locomotives built at the Baldwin Locomotive Works during the twelve years from 1872 to 1883, inclusive :

1872	422	1878	292
1873	437	1879	398
1874	205	1880	515
1875	130	1881	548
1876	232	1882	569
1877	185	1883	555

Total number built, 4,488

IT is among the probabilities that steel will supersede wood for the frames of passenger cars in England, and perhaps also of freight cars. The Northeastern Railway Company are now building at their works a number of cars with steel frames, and if on trial they prove satisfactory all the wooden-framed cars will be replaced by the new style as they are retired from service.

THE Mexican Central Railroad Co. is trying the experiment of building its own freight cars, the framework being of oak from the company's forest at Nado, while the pine comes from the forests near Patzcuaro, in Michoacan, whence it is hauled to the Mexican National at Morelia, and delivered to the Central at Celaya. This makes a haul by mules of some fifty miles and by rail some 300 miles.

A WRITER in a contemporary journal says: "I discovered, many years ago, that wood could be made to last longer than iron in the ground, but thought the process so simple that it was not well to make a stir about it. Posts of any wood can be prepared for less than two cents apiece. This is the recipe: Take boiled linseed-oil and stir in pulverized coal to the consistency of paint. Put a coat of this over the timber, and there is not a man that will live to see it rot."

AT the recent annual meeting of the Woodruff Sleeping and Parlor Coach Co. the following directors were chosen: Job H. Jackson, William G. Johnston, E. Poulson, J. M. McClintock, E. J. Unger, Charles I. Travelli, Wilson McCandless, Henry Whelen, James J. Donnell. The Board of Directors met subsequently and selected the following officers: President, Job H. Jackson; Vice-President, William G. Johnston; Secretary and Treasurer, Augustus Trump; General Manager, J. C. Paul.

The *English Mechanic* says: "Although the average speed of trains in the United States is 20 per cent below the mean speed of trains in this country, all things considered, the service controlled by the American engineers compares favorably with any in the world. The American engineers at first copied English builders, and made locomotives with single drivers; but, as is their wont, they quickly made improvements, and we are not disposed to dispute that the American locomotive of to-day is 'one of the most perfect pieces of mechanism wrought out by the hand and mind of man.'"

GRANULATED CORK is an excellent non-conductor of heat, and is on this account a very desirable material in the construction of refrigerator cars. It is also used in the floors of passenger cars as a "deadener" of the noise of the running gear. It is made by running the scraps in a cork factory through a mill which reduces them to a coarse powder. The manufacturers, Armstrong, Brothers & Co., of Pittsburgh, make several tons of it per day, for which there is a steady demand from car-builders and refrigerator manufacturers, and also for the filling of ice-houses.

THE Muskegon (Mich.) Car Works are busy on a contract for 500 cars for the Nickel Plate road, and are running to their full capacity. Important additions have been made to the machinery of the works, by which their former capacity for turning out freight and passenger work has been more than doubled. The company has built a number of coaches and baggage cars for the Chicago & West Michigan road, to be run between Chicago & Grand Rapids. These are all 60 feet long. The coaches are finished in mahogany throughout, have toilet rooms for ladies and gentlemen respectively, Hale & Kilburn's improved seats, large windows, with curtains instead of blinds, and smoking-rooms with seats upholstered in leather.

THE Cowell car coupler was recently tested on the Valley (O.) Railroad. The Cleveland *Leader* says of the test: "This test shows it to be perfectly adapted to freight and stock cars. It seems to be as simple in construction as an automatic coupler can well be—being a hook, similar to the Miller, with a pivoted head. Its owners claim for it that it is the cheapest self-coupler yet made, costing but little more than the common link and pin coupler. It is easily uncoupled and operated from the side or top of the car. It couples with any common coupling by using a link. The severest tests recently were made in coupling and uncoupling on the shortest curves, in all of which it worked perfectly."

At the Mount Clare shops of the Baltimore & Ohio Railroad there is a special department for the manufacture of brass work, hardware, telegraphic instruments, lamps, etc. Nickel and silver plating is also carried on. The ornamental finish of the various articles, knobs, locks, lamps, baskets, hinges, etc., is very tasteful and beautiful. The designs are mostly new, and are furnished by a person employed by the road for this purpose. Most of the metallic car trimmings are of solid bronze, which is a great advantage in finishing, the color being that of the metal and not of the lacquer. The quality of these articles is not only equal to that of similar goods obtained outside, but they can be made at a less price even.

A FEW days ago, a trial was made of the Radial Truck on the railway track of the great East River Bridge. This truck is built by the American Radial Truck Co., and has been described in previous numbers of the CAR-BUILDER. A car mounted upon these trucks was run over the curves at both ends of the bridge. In order to show the rigidity of the axles on the straight track, a piece of oak timber 4 inches wide and 3 inches thick was placed on one rail some distance in front of the wheels. Both of the wheels on that side of the truck mounted the girder and dropped into position again on the other side of it. At the New York end, on a very sharp curve of but 90 feet radius, the wheels on the outer rail stood 4 inches further apart than those on the inner rail.

A COMPLAINING correspondent of a rural paper thus refers to one of the crying abuses of elevated railway management in New York City: "While in a complaining mood, I will refer to the outrageous manner in which the Elevated Railway cars and stations of New York are disfigured by advertisements. To start up town, you must pass under an arch at the entrance to the station, which depicts in crimson and gold letters and figures the triumphs of an alleged curative oil, and enter the station in the face of scores of quack medicine bill-boards. Once in the cars, you must sit and face a whole line of framed and glaring advertisements of prize cigarettes, plug tobacco and sour-mash whiskies. So a great corporation, worth $50,000,000, annoys its decent patrons and aids and abets the raid upon money and morals. One of these days New York people will get up a reform movement, the watchwords of which will be 'Clear the advertisements out of the Elevated Stations and Cars!'"

A FEW years since the Detroit Car Spring Company was organized and commenced operations in a small brick structure on Michigan avenue. The company soon erected an addition to their works, in the shape of a rolling mill to supply them with rolled steel bars. They now propose making all kinds of steel for the market, especially high-grade tool steel. To do this they have constructed another large building, called a "hammer shop," and are hurrying forward the work preparatory to starting in the latter part of March. The dimensions of the new building are 150×60 feet, and it will contain three large steam hammers for forging steel into bars, four furnaces for heating the metal, and one Siemens crucible furnace, of 30 pots capacity, for converting wrought iron into steel. When finished the works will comprise the spring shop, the rolling mill, containing two trains of rolls and two Swindell gas-heating furnaces, with a capacity of 40 tons of steel bars, assorted sizes, per day, and the hammer shop.

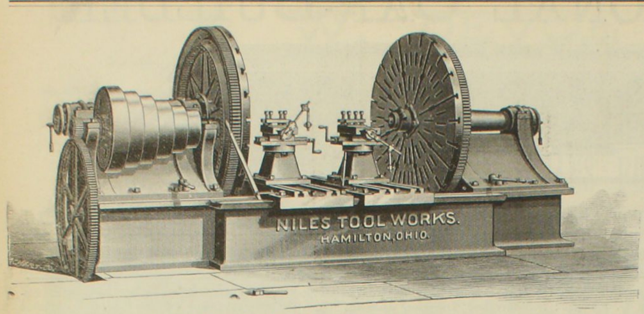
MR. JOHN BLACK, General Master Mechanic of the Cincinnati, Hamilton and Dayton Railroad, is using cast iron guides on locomotives. He has been experimenting with this kind of guide for several years, with such satisfactory results that he is now fitting them upon all his engines. He has several locomotives which have run nearly 150,000 miles, and one can not slip an ordinary business card between the cross-head and guide. It has been so long since they have had to line up a set of guides on account of wear that they say they have about forgotten how it is done. Ordinary cast iron is used—not car-wheel iron. Many master mechanics, who have not used cast-iron guides, say when they commence to cut they go all at once. So will any journal go when it is neglected, and so will a crown sheet go down if the water is allowed to go low. With ordinary attention cast-iron guides give no trouble, and in three years none have cut or given suddenly out with Mr. Black. This seems to be another case where a material gives the very best results on one road, yet will render no service at all on roads where it is not in good repute.—*American Machinist.*

Report of the Proceedings of the Seventeenth Annual Convention of the Master Car-Builders' Association, held in Chicago, June, 1883.

This report, although a little late in making its appearance, is very complete in the arrangement of its contents, and bears evidence of having been carefully edited. The volume contains 180 pages, 114 of which are occupied with the proceedings proper of last year's convention, consisting of the reports of committees and the discussions thereon. We have already printed a summary of these discussions, which does not differ materially from the full report. Probably the most interesting of these is the one on standard freight and passenger car trucks, which is very elaborate, and worthy of special attention as embodying the views of prominent members of the Association on this perplexing subject. The same may also be said in regard to the discussions of the report of the committees on accidents to trainmen, and standard wheel gauges and flanges.

The report also contains the "letter ballots" on the adoption of limit gauges for round bar iron, and wheel gauge and flanges and treads of wheels; minutes of meetings of the Executive Committee; the standards of construction that have been recommended by the Association from time to time in years past; rules governing the interchange of freight cars; the constitution and by-laws of the Association; committees and subjects to be reported on at the annual meeting in June next; list of members; and a very complete analytical index.

The illustrations consist of the method adopted at the last year's convention for marking line cars; proposed brake gear for standard freight truck; the standard M. C. B. axle; journal-bearing and key; journal box; pedestal; and wheel and axle gauges.



DOUBLE-HEAD DRIVING WHEEL LATHE.

The engraving represents a new double-head driving wheel lathe, built by the Niles Tool Works, of Hamilton, O.

This lathe is designed with special reference to power and strength to adapt it to the heavy work for which it is intended. The cut represents a lathe 84 in. swing, capable of turning drivers 6 ft. 6 in. diameter on the tread. It is shown without quartering and crank pin boring attachment. When desired this attachment can be furnished. It is located on the back-head, the spindle extending through the face-plate and drilling from the outside of the wheel inwards.

In order to get the greatest strength and stiffness at the point where the greatest strain is imposed, the front web of the bed is elevated, so that very short and stiff tool posts may be used. The back web of the bed, which is not subjected to such great strains, is made low, so as to facilitate the handling of wheels in and out of the machine.

The driving cone has six steps for a belt 6 in. wide.

One face-plate has internal and external gears, so that it may be driven at twelve different speeds; the right-hand face-plate has external gear only, thus giving it six different speeds. The face-plates may be driven together or separately, as desired, or at the same or different speeds.

Every gear about the machine, including the large internal and external gears on the face-plates, are accurately cut from the solid. These large face-plate gears are not cut or cast directly on to the face-plate, but are separate rings bolted fast to it by a heavy flange. They are equally as strong as if cast with the face-plate, and at the same time, should any accident occur causing the breakage of a number of teeth, the gear can be readily replaced.

The main driving shaft which transmits the power from one face-plate to the other is a heavy steel forging of extra large diameter, so as to be absolutely free from any torsion, which is a fruitful cause of chatter in the machine. In this lathe this shaft is 5½ in. diameter.

The main spindles to which the face-plates are attached have very large and long bearings. Each main spindle has an internal sliding spindle, with sufficient traverse that wheels may be turned on their axles with both crank pins in place. The compound rests have automatic feeds in all directions, operated by overhead rock shaft, driven by feed disks on the ends of the spindles.

Photographs of all sizes of driving wheel lathes, similar to the one described above, may be had on application to the Niles Tool Works, Hamilton, O., or at their branch offices in Chicago or Philadelphia.

Electric Propulsion for Elevated Railways.

The New York *Tribune* published a few weeks ago a communication from Mr. Thomas Whiteside Rae, C. E., setting forth the economical advantages that would accrue from the use of electricity instead of steam for the running of trains on the elevated roads of New York city. The article being too long for our space, we make room for the following synopsis:

These roads, Mr. Rae says, including sidings, etc., comprise 32 miles of track, upon which 150 locomotives are or may be running simultaneously, each weighing, with coal, water and personnel, 44,800 pounds, and at a speed of 13¼ miles an hour three cars, each weighing, with a seated load of 48 persons and the gateman, 34,230 pounds, the total work performed by the locomotives in any one minute being 3,127 h. p. nearly; and assuming as a maximum load 100 persons per car, the total work done at any instant would be at the rate of 5,444 h. p. nearly. To do this work requires 227 steam locomotives, costing $6,500 each. But assuming 25 persons to a car as a fair average for all times of a day, the work done would be 547 pounds moved 1,100 feet per minute, or 18 h. p. at a cost of nearly 28 pounds of coal per h. p. per hour—the warming of the cars being included, and the banked fires in reserve engines. The expense, taking one hour as the unit of time, will then be—

Interest upon and depreciation of 227 locomotives at the rate of 15 per cent. per annum	$25.26
Wages of attendants for same	47.30
Total cost at $3 per ton for coal for 150 locomotives developing 18 h. p. each at 28 pounds per h. p.	102.00
Total per hour	$174.56

To do the same work electrically the following equipment would be required. It is quite possible to obtain dynamos which will return at any ordinary distance, 75 cent of a h. p. developed by steam engines at the generating station, and this can readily be had for 2 pounds of coal per hour from large, improved constructions. But assuming 50 cents or thereabout to be the ultimate, and a duplicate plant to be superfluous, the items will be:

6 stationary steam engines, 1,800 h. p. each, with boilers, costing inclusive of erection	$270,000
8 generating dynamos 1,350 h. p. each, erection included	273,375
2 station houses	50,000
227 electro-motors, $3,000 each	681,000
32 miles central rail, laid	40,000
	$1,314,375

The current expenses of the running of this plant, including interest and depreciation, fuel, labor at power stations and one attendant for each motor, one estimated at $76.56 per hour.

Among the incidental advantages not mentioned above, are reduced wear of road bed by diminished weight in the tractors, some idea of which may be formed from the fact that the average adhesion to the rails of an electro-motor is about 40 per cent. of its weight, as compared with 20 per cent. in the steam locomotive; that is to say, an electro-motor of half the weight of a steam locomotive will haul the same load, to say nothing of the absence of smoke, cinders and exhaust steam.

THE car equipment of the Chicago & Atlantic Railway is not surpassed in attractiveness by that of any other road in the country. The sleeping cars were built at the Pullman Co.'s Works, and are of the latest design and finish. Each car is provided with a buffet in charge of a competent caterer. The first-class coaches are finished in dark woods, and handsomely upholstered with a crimson plush, a beautiful moquette carpet is laid the entire length of the aisle, and at one end of the car is a lavatory for the convenience of ladies. The second-class are finished in light woods and have cane seats. Both classes are lighted with Pintsch gas. The cars are uniform in their external appearance, and all of them have 42-inch Allen paper wheels.

THE Philadelphia, Wilmington & Baltimore road has on hand 300,000 feet of pine shelving for its fruit car equipment. About the same additional quantity is purchased every season, and the whole put into the cars in readiness for the fruit movement, and at the close of business in the fall half of it is stored again, the remainder having been destroyed or worn out. The shelving has to be put into the cars within a period of about three weeks, and it is usually taken out in a much less time.

Boston & Albany Railroad Passenger and Freight Car Framing.

The method of framing passenger cars at the Allston (Mass.) shops of the Boston & Albany road has attracted a great deal of attention for several years past. The cars that have been built there are the lightest in proportion to their length, strength and durability, that can be found on American railways. Their seating capacity ranges from 68 to 76, and they are either 54 or 57 feet in length. Those more recently constructed have 42-inch paper wheels, yet their average weight is but a little over 45,000 pounds. The famous car, "No. 44," built in 1879, weighs only 35,990 pounds and seats 68 persons. The body of this car weighs only 23,970 pounds and its trucks 12,020. This car, however, had 33-inch wheels, which are very much lighter than large paper wheels, the difference on this account being about 5,000 pounds per car.

The side framing of these cars, as now constructed, is shown in the engravings, which are produced from photographs taken in the erecting shop. Fig. 1 is a perspective view of the framing of the car side before the panels are put on. Fig. 2 is an enlarged view, showing the portion of frame over the bolster.

As at present built the three windows nearest the ends are a little narrower than the others. This is necessary in order to harmonize the spacing of the seats and panels toward the center of the car. A pair of posts placed close together alternate with posts having panels between them, the effect of which is to give a light and open appearance to the central portion, while retaining the necessary strength and rigidity. As the posts themselves are but an inch in thickness, and the framing below the windows being equally light, it will readily be seen that altogether the frame is of the very lightest description. This necessitates a careful selection of every stick and the rejection of every one that is in the least defective. A very noticeable peculiarity of this construction is the absence of window-braces and the ordinary truss-plank. The required stiffness and resistance to sagging is obtained by a "truss-arch" extending, as shown, from bolster to bolster. This arch is 5 inches wide and ¾ of an inch thick, and is let into the framing its entire length, the ends being let into the sill and fastened, as shown in Fig. 2, by five wood screws to the post and a piece of blocking. The blocking is secured to the sill by two lag-screws. The posts have two tenons at the bottom which fit into corresponding mortises in the sill.

The posts at the top run up on the outside of the plate and are mortised into it, as shown in Fig. 1, the object of which is to provide for the greatest possible lift for the window sash, the gain effected by allowing the sash to pass up on the outside of the plate and inside the panel, being of considerable importance when very large glass is used. Each post is secured to the plate by a wood screw.

Dispensing with the ordinary truss-plank is doubtless regarded by many car-builders as a radical innovation, while others consider its value as more or less problematical. The substitution of the truss-arch was first tried several years ago by Mr. Adams, the General Master Car-Builder of the road, and no practical objection to it has yet been made with respect to service. The old cars with this construction hold their camber and keep up quite as well as those having truss-planks.

Figs. 3 and 4 represent some of the features in the construction of the standard freight cars of the Boston & Albany road, which will doubtless be interesting to car-builders.

Fig. 3 shows half of a car with the end sheathing and iron work in place, but without roof and siding. The bracing is so disposed as to form a strong truss. The braces and posts have no tenons, and are held in place by pocket castings, as shown. There are three patterns of

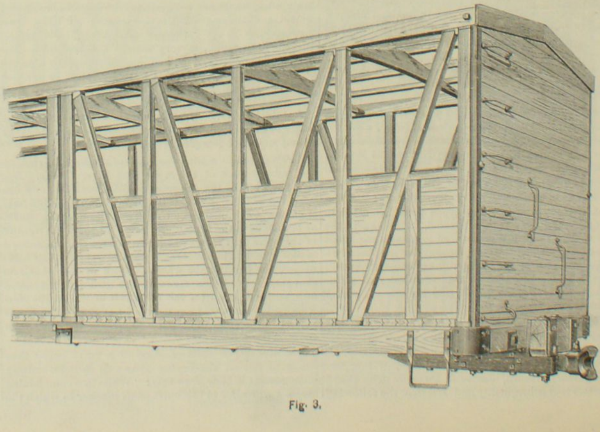


Fig. 3.

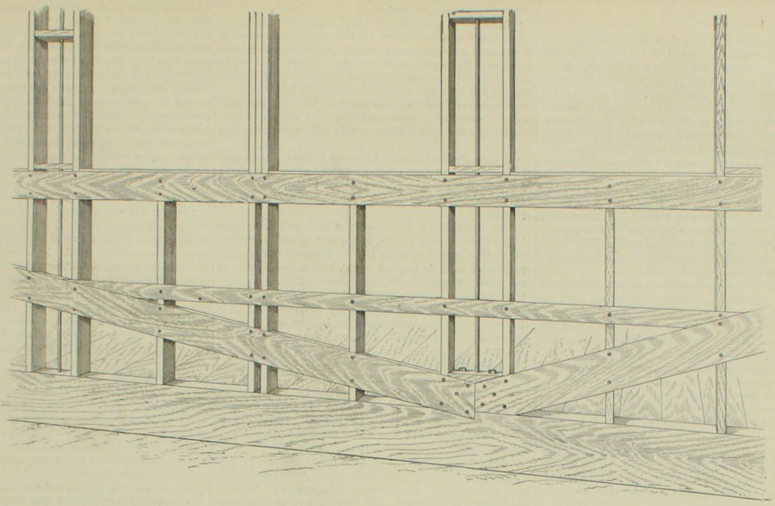


Fig. 2.

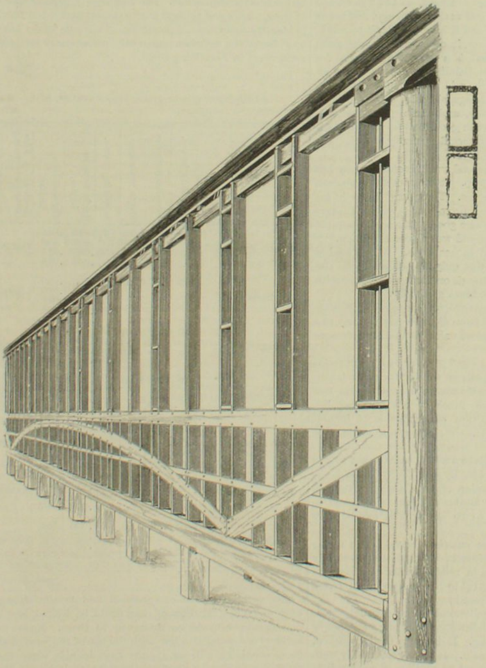


Fig. 1.

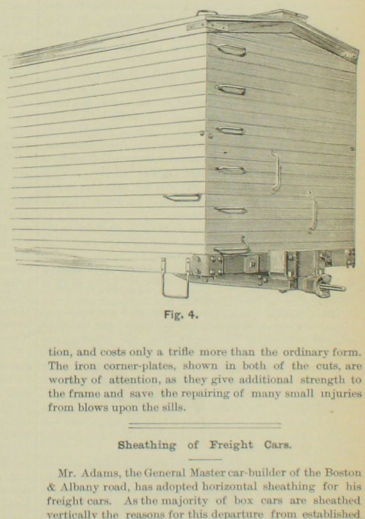


Fig. 4.

these castings, one for a single post, another for a post and brace, and another for a post and two braces. Each casting has a hole in it for the brace rod, which passes down at he side of the posts. These iron seats give an excellent bearing for the posts, and prevent them from crushing into the sills. They also tend to prevent decay; but as an additional safeguard 6 inches of the ends of the sticks are painted. The posts are all of the same dimensions, including the corner ones, which are two of the same size bolted together. Fig. 4 shows the position and shape of the step, ladder-rounds and grab-irons on the end of the car opposite the brake-wheel end. Two of these irons are placed vertically to give the brakeman a good hold when uncoupling from above or climbing up between the cars. The lower one of these vertical irons is placed on both ends of the car, but on the brake-wheel end the upper iron is omitted, the brake-shaft affording a sufficiently good handle for a man crossing the end of the car. One of the ends of the lower ladder-round is turned up in a peculiar way, as shown, so as to prevent the foot from slipping off when getting up or down. This may seem a trivial matter, but it is obviously a much-needed precaution, and costs only a trifle more than the ordinary form. The iron corner-plates, shown in both of the cuts, are worthy of attention, as they give additional strength to the frame and save the repairing of many small injuries from blows upon the sills.

Sheathing of Freight Cars.

Mr. Adams, the General Master car-builder of the Boston & Albany road, has adopted horizontal sheathing for his freight cars. As the majority of box cars are sheathed vertically the reasons for this departure from established usage are worth considering. The sheathing is put on with the tongue up, and being nailed firmly in place the car frame is stiffened to a very appreciable extent. With vertical boards there is practically no increase in the stiffness of the car, and the boards collectively do not tend to prevent sagging as they do when placed horizontally. When the lumber shrinks the vertical joint opens, and the water, running down the side of the car, works inside around the tongue. With horizontal boarding, on the other hand, the water may penetrate the joint but it cannot rise over the tongue. When the car is in motion the water is blown out of the joint instead of being blown through it if it is very open.

For this reason the horizontal boarding seems to have a decided advantage over the vertical. The most marked advantage appears in repairing an injury upon a corner, followed by stripping or raking along the sill. Vertical boarding usually requires the replacement of the whole sheathing as far back as the last injured board. With horizontal sheathing only those boards are replaced which are broken. In taking out a side sill or making any other similar repairs the superiority is very marked. It appears from these considerations that the advantages are greatly in favor of sheathing put on horizontally.

The Valuable Timber Trees of Cuba.

For the information herewith given in regard to Cuban woods we are indebted to an article in *Van Nostrand's Engineering Magazine*, by Mr. Esteban D. Estrada, M. E. The tests were made by him in the Mechanical Laboratory of the Stevens Institute of Technology. We also append, for the purpose of comparison, a table of tests of some of the principal native woods of the United States used in car construction; and although the figures may not in every case represent the resistances with absolute precision, they are no doubt sufficiently accurate for purposes of comparison.

"The timber trees of Cuba, like those of every tropical country, are remarkable for their great size, both in diameter and height, their almost perfect indestructibility by those agents which ordinarily injuriously affect timber, such as insects, dry-rot and decay generally, their hardness and homogeneousness, the beauty of their texture and grain, and the fragrance of their wood.

"As a class they are but little known in the United States, a few varieties only being imported, such as lignum-vitæ, rosewood, ebony, various kinds of cedar, and the several varieties of mahogany. The extended use of hardwoods in interior and exterior house decoration will, it is thought, greatly increase the demand for certain valuable Cuban woods. The whole subject has a special interest and value to the writer, these being woods with which he is familiar, and he has ventured to take the matter of the strength of certain Cuban woods as a subject for investigation. It was decided to confine the investigation to comparatively few of the more important and representative types of timber, on the natural supposition that the slight differences between the several varieties would not seriously affect the general conclusions to which such experiments would generally lead."

In testing these woods, such pieces were selected as would best represent the useful timber trees of the country. The experiments were made by transverse and torsional stress. The testing machines used were the standard ones of the Mechanical Laboratory of the Department of Engineering of the Stevens Institute of Technology. Most of our readers are familiar with them, and they need not to be here described.

"In preparing the test-pieces for the tensile tests it was found necessary to provide against the shearing or crushing of the pieces in the chucks of the testing-machine. The test-pieces were prepared, viz., 1.5 inches wide, 1 inch thick, and 14 inches long; a hole 1 inch in diameter was then drilled at a distance of three inches from each end, or as much as the yoke of the machine would permit; it was found, however, that this distance of three inches thus available at the upper end was not sufficient to prevent shearing. Thus the experiments for tension are incomplete, and but few are reliable.

"The compression specimens were made as large as the capacity of the machine would allow, always preserving the proper ratio of length to diameter."

The following is a description of the more notable woods, accompanied with some notes in regard to their behavior under transverse loads.

"In obtaining the transverse tests, each specimen was planed to a square section and to the largest size which its original dimensions permitted; then the breadth and depth were accurately measured by means of a micrometer screw reading to the 0.001 of an inch, after which it was placed on the transverse testing-machine, fixing the supports so as to allow 2 inches of the test-piece to project beyond them. The beam being carefully balanced, the weight of the piece included, a load of 50 pounds was applied each time up to 200 pounds, and the corresponding deflections measured.

"Baria (*Cordia gerascanthoides*) attains a height of about 60 feet (18.3 meters), and a diameter of 18 inches (46 centimeters), and often more. It is found in nearly all parts of the island, being more abundant toward the central part.

"The wood has a dark greenish brown color in the heart, and is lighter in the sap-wood. It is highly prized on account of its strength, durability and lightness. The wood when varnished has a very handsome appearance. It is extensively used in framing, carriage-making, and general house-fitting. Its specific gravity is 0.78, a cubic foot therefore weighs 48.6 lbs. The strongest sample tested of this wood was 36 inches long, by 2.1 inches wide, and 2.12 inches deep. This specimen broke at tension side diagonally across with the grain. It sustained 1,200 pounds after the first rupture, increasing up to 1,325 pounds, when it broke suddenly in two, the deflection at this point being 1.847 inches.

"Majagua Azul, the *Paritium elatum* of the botanists, is very abundant, reaching a height of 50 feet (15.2 metres), and often more. It attains a great age. The forests of Camagüey and Vuelta Abajo abound with this tree. Logs of from 16 to 20 inches (45.7 to 50.8 centimetres) square are very common. The trees growing in dry and rocky soils give the best timber, so far as strength and elasticity are concerned.

"The wood is used for ships' ribs and framing, planks and boards, carriage work, furniture and gun stocks. The bark of this tree furnishes an excellent material for ropes and hawsers, being particularly valuable because so little affected by dryness or dampness.

"The wood is very easily worked, closely resembling the white pine of this country in this respect. In color it is of a dark greenish blue, from which property it derives its name. Its specific gravity is 0.72. Weight of a cubic foot, 43.9 lbs. The best specimen of this was 28 inches long by 1.98 wide and 2.12 inches deep. It broke first at tension side at 1,050 lbs., and midway between the supports. Continued to break gradually, and when the load was 300 lbs. the final deflection was 5.75 inches; fibrous fracture.

"Jucaro Prieto (*Bucida*) is found in large supply near the southern coast, and attains a height of from 60 to 80 feet (18.2 to 24.3 meters), for which it requires 50 to 55 years' growth; it has lateral roots, and yields gum by incision.

"The wood has a dark brown color, much resembling black walnut, is very strong, tough and elastic, is heavy, fine grained and free from knots. It stands the weather remarkably well, is worked easily, and is susceptible of good polish, thus producing a handsome effect.

"It is largely employed in naval constructions, for purposes where strength and durability are required. It is also very extensively used by millwrighters, and is an excellent material for posts, piles, and general dock constructions. It can be obtained in logs of 36 feet (10,9 meters) length, and 16 inches square. Weight per cubic foot 67.3 lbs. Its specific gravity is 1.08.

"The sample giving the best results was 28 inches long, 1.45 inches wide and 1¾ inches deep. It broke at 1,675 pounds, with a deflection of 0.85 inches. Continued to break, and at the last break the total deflection was 6 inches. Remarkably tough wood.

"Jiqui comun (*Bumelia nigra*) is found in large supply, especially in the center part of the island, where it abounds in all kinds of soil. It attains the height of from 50 to 70 feet (15.2 to 21.3 meters). The largest section obtainable after squaring is 18 inches (46 centimeters).

"The wood is one of the hardest known, is exceedingly heavy, fine grained, and very compact. It has a rosewood color, and becomes harder and darker with age, and when very old it is almost black, and it is very difficult to work. It is principally used for posts, in consequence of its great durability and strength, and is a very fine material for dock-piles, owing to its non-liability to decay; is not attacked by insects, and it is said that it petrifies under water. It is also used for telegraph poles, piles for foundations, scaffolding, railings, and main posts for gateways. It turns easy, and with good tools it can be made of any desired shape. Its specific gravity is 1.20. The weight of a cubic foot is 74.8 lbs.

"The first sample of this wood was 28 inches long by 1.82 inches wide, and 2 inches deep. It broke at 2,650 pounds, with a deflection of 1.36 inches. Three large knots in the specimen; one under the cross-head where rupture occurred. Specimen otherwise good. The second sample was also 28 inches in length and was a good specimen. It was 1.9 inches wide by 2.35 inches deep. With a load of 200 pounds its deflection was only .025 of an inch. Its first rupture was at 3,300 pounds on the tension side, with a long crack. Continued to break gradually.

"Majaguilla (*Carpodiptera cubensis*) is found in Buelta-Abago; attains a height of from 40 to 50 feet (12.1 to 15.2 meters), and its bark is of great value for the manufacture of rope.

"The wood is hard, heavy and strong; it is quite resinous, and consequently difficult to work. Its color is yellowish red. It is principally used for posts, carts and other constructions where finish is not of great importance. The largest section obtainable is 14 inches. Its specific gravity is 1.11. Weight of a cubic foot 69.2 lbs.

"The best specimen of the two which were tested was 40 inches long, 1.66 inches wide, by 2.12 deep. It broke at 2,250 pounds, with a deflection of 1.723 inches. Tension side first; very good and fibrous rupture. Continued to break gradually. Proved to be strong and exceedingly tough material.

"Dagame (*Colycophyllum candidissimum*) is one of the most plentiful trees of the forests of Cuba, being generally found near mountains and in reddish soils. A common height is from 40 to 50 feet (12 to 15.2 meters). Its trunk is straight and quite free from branches.

"The wood is of a pale yellow color, very fibrous, is close grained, thus resembling boxwood; is moderately heavy and very strong and elastic. It is very easily worked, either across or with the grain. It turns remarkably well, is entirely free from knots and susceptible of good polish. It is very durable.

"It is used very extensively in general carpentry, for the woodwork of plows, cart axles, spokes and spikes, is an excellent material for house framing for its strength and durability, and joiners prefer it for their work to most other woods. It is also very extensively employed by carriage manufacturers, for ships' yardarms and other similar purposes. The largest section that can be obtained after squaring is 12 inches (30.5 centimeters). Its specific gravity is 0.90. Weight of a cubic foot, 56.1 lbs.

"One of the first samples tested was 40 inches long by 1.94 inches wide, and 2.28 inches deep. It was straight-grained, very uniform in color and sound in appearance. First rupture took place at 3,450 pounds at tension side, upper side unbroken; very fine, fibrous rupture, and directly under the cross-head. Second rupture at 3,350 pounds. The total number of ruptures were five, at the last of which the hand-wheel had been turned to its lowest position, the sustained load being 150 pounds and the deflection at this point 7 inches. The third sample was also 40 inches long; but was 2.03 inches wide by 1½ inches deep. It broke at tension side, fibrous rupture occurring at 2,100 pounds, second at 2,250 pounds, third at 2,280 pounds, fourth at 2,000 pounds, fifth at 2,150 pounds, when the deflection was 4.75 inches. When the deflection was 5.75 inches the load sustained was 1,750 pounds, being held for more than five minutes, after which the load was removed and the set produced was 2⅛ of an inch, thus showing it to be an excellent material, very elastic, tenacious and remarkably strong.

"Jucaro mastelero (*Bucida*) is found on low lands and valleys. It attains a height often exceeding that of the jucaro prieto, which is one of its varieties. Its fruit is of great value for cattle food. It is very abundant on the low lands of Camaguey. The wood has a light yellowish brown color, is very strong, hard and elastic; it has very little sap-wood, and is readily worked. It is used very much in naval constructions, for railroad ties, framing, millwrights' work, and for cart axles it is given the preference. It can be obtained in logs 16 inches square. Its specific gravity is 0.89. The weight per cubic foot is 55.5 pounds.

"One of the specimens broke suddenly at a knot two inches from right-hand support. Breaking load 1,150 pounds, deflection 2.25 inches. The same piece was tried again, making the distance between the supports equal to 32 inches. Loads were then applied, and it broke at 1,500 pounds, with a deflection of 1.75 inches. Continued to break gradually, and when the sustained load was 100 pounds the deflection was 4 inches. The breadth of this specimen was 1.56 inches, and the depth 1½ inches."

In explanation of the fact that most of the botanic as well as the common names have been introduced in our extracts it is necessary to say that without them identification is often impossible. The common or popular names of trees, plants and timbers vary so much that it is difficult to identify them beyond possibility of mistake in any other way, hence the use of an apparently unnecessary scientific refinement in describing them.

DEFLECTION UNDER TRANSVERSE STRESS, ETC.

WOODS.	Length in inches.	Breadth in inches.	Depth in inches.	Loads in pounds.	Deflections in inches.	Difference in inches.	Modulus of Elasticity per formula $E=\frac{Pl^3}{4Dbd^3}$
Jucaro Prieto B_2.	28	1.45	1.75	50	.016	.016	2195200
				100	.032	.016	
				150	.050	.018	
				200	.068	.018	
Baria I_2.	36	1.50	2.00	50	.026	.026	1790000
				100	.052	.026	
				150	.078	.026	
				200	.104	.026	
Dagame J_1.	40	2.06	2.18	50	.015	.015	2500000
				100	.030	.015	
				150	.045	.015	
				200	.060	.015	
Jiqui Comun E_1.	28	1.82	2.00	50	.0075	.0075	2520952
				100	.0150	.0075	
				150	.0225	.0075	
				200	.0300	.0075	
Jucaro Mastelero B_8.	40	1.56	1.50	50	.056	.056	2500000
				100	.118	.052	
				150	.183	.065	
				200	.248	.065	
Majagua Azul D_3.	28	1.98	2.12	50	.007	.007	2000000
				100	.014	.007	
				150	.021	.007	
				200	.028	.007	
Majaguilla L_2.	40	1.66	2.12	50	.020	.020	2000000
				100	.040	.020	
				150	.060	.020	
				200	.080	.020	

The experiments on compression and tensile strength were much less satisfactory than could be desired, and we therefore have made no reference to them. Many car-builders not being familiar with the use of the term modulus of elasticity, will not at once gain definite ideas from the figures. To obviate this difficulty entirely we have added another table, which gives similar figures for the more common American woods, among which are white and yellow pine, black walnut, white ash and white oak. Bearing in mind, then, that the modulus of elasticity is the relation of the amount of distortion to the load producing it, the stiffness of these woods can be compared with our own at a glance even by a person unfamiliar with mathematics.

In the formula:

E = Modulus of elasticity.

P = Any load within the elastic limit.

l = Distance between supports.

I = Moment of inertia, which for a rectangular section is $\frac{1}{12} bd^3$.

Δ = Deflection.

The following table of Deflections of American Woods under transverse stress is given by Professor Thurston :

Wood.	Length.	Breadth.	Depth.	Modulus of Elasticity.	Deflection. Ultimate.	Deflection. At elastic limit
	in.	in.	3		in.	in.
White Pine	54	3	3	883,636	1·28	·86
Yellow Pine	54	3	3	3,534,727	1·96	·84
Locust	54	3	3	2,046,315	2·70	·82
Black Walnut	54	3	3	1,944,000	·72	·50
White Ash	54	3	3	1,080,000	2·50	1·50
White Oak	54	3	3	1,620,000	1·76	·90
Live Oak	54	3	3	1,851,428	1·38	·94

March Meeting of the Car-Builders' Club.

CAR WHEELS AND AXLES.

The President announced that the subject for discussion was "Car Wheels and Axles and the Seating of Wheels to Gauge on Axles."

A number of letters on the subject which had been received from various parties were read, among which was one from W. S. G. Baker, of the Baltimore Car Wheel Co., which was in substance as follows :

"The subject of car wheels has been so fully discussed that I do not think anything I could say would influence a change in the present system of so many railroad companies as to their purchases of wheels, and until it is changed they will not be better served. I believe the notoriously bad character bestowed upon the chilled wheel is well deserved. I also believe railroad companies should, in a great measure, be held responsible for such a state of affairs. After giving the question of chilled wheels careful thought I am well satisfied that a cheap and effective service can not be had by the use of cheap material, but can only be obtained by the use of the very best and most carefully selected charcoal irons. I consider safety the first element. This can not be obtained without strength, as it is well known that a deep and even chill is necessary for service and that the chilling does not add strength to the structure. Only such irons should be used as will carry a deep chill with perfect safety, and such can only be ascertained by a daily test. I claim that by using such irons, properly melted, with a method of molding and pouring to insure a round form, clean rims and solid castings, to which should be added proper annealing and a careful system of inspection, it is possible to make chilled wheels superior to any in respect to safety and economy. After years of practical and experimental experience I am convinced these are facts, and I mail you some circulars showing results which express all I could say were I present before the club."

Mr. L. Garey called attention to a wheel report of the Lake Shore & Michigan Southern road, in which one wheel is reported as making 231,743 miles ; another 183,841 miles, and others 112,681 miles ; 146,372 miles ; 106,500 miles. The general average of the wheels, as stated, is 57,166 miles. This is for 33-inch wheels, under engine, tender and passenger equipment. The general average of 30-inch wheels is 56,486 miles ; of 28-inch wheels, 53,578 miles ; 26-inch wheels, 57,953 miles. The general average of 23-inch wheels worn out in five years is 72,055 miles, and of 30-inch wheels, 49,533 miles. This appears to be a very good record of cast-iron chilled wheels. He had learned from one of the roads using 600-pound wheels that during the past winter they have not had a breakage or cracking from any cause that would endanger the safety of the wheels.

Mr. C. A. Smith : Two years ago or so, at one of our wheel meetings there were some statistics given as to how many miles a cast-iron wheel should run to make it equal to the steel-tired wheels as a matter of economy. I do not know. I have no figures, and have no idea of it myself, but I think tables have been made showing how many miles a cast-iron wheel should run and how many miles a steel-tired wheel should run to make the economy of using them equal.

Mr. L. Garey : If my memory serves me right the record kept for thirty days on some of the trunk roads as to the wheels broken in service, showed something like 90 odd per cent. of those failing to be from cracked plates. That would indicate the plate to be a weak point. My experience leads me to believe that our cast-iron wheels are not heavy enough for the service required. I should like to hear from some of the wheel men present what they think as to the quantity of metal required to make the most durable wheel, taking into consideration present requirements. (A long silence.) If I cannot get any expression of opinion on the wheels, we will go on to the next subject, which is the seating of wheels to gauge on axles. Some days ago I addressed a circular letter to several parties throughout the country asking them to give me their opinion as to the fitting of wheels to gauge on axles, referring more especially to the straight and taper fitting. This was suggested by the action taken at the New England Railroad Club at their last meeting, at which I think the general voice was in favor of fitting wheels tapering on axles. I would ask the Secretary to read a few of the replies.

The first letter read was from General Master Car-Builder John Kirby, of the Lake Shore & Michigan Southern road, which was as follows :

"*L. Garey Esq.:*

"Dear Sir: The subject of seating wheels on car axles is quite an important one, especially as so many 42-inch wheels are coming into use. Though the length of hub and diameter of axle, also the pressure at which a 42-inch wheel should seat on an axle will be a subject, perhaps, for future meetings, it is one I have no doubt will bring out as much diversity of opinion as does the straight and taper fits. My opinion is that there is no rule as to the exact taper that a fit should be made to be just right. That is one of the ways of doing work incidental to primitive times, when the screw-wheel press was the only power known to drive the wheels to their proper seating, the design of the taper being to save time because the wheel could be pushed half the length of its seat by hand, the press moving it to final seating. The same was true when pulling the wheels off, but this time saved in pressing on is more than consumed by the man at the lathe setting one end of his lathe out of center so as to produce the desired taper to his wheel-seat. To produce the exact 64th taper requires more skill at the lathe and boring mill than is usually employed on such machines at present, and you see how difficult a thing it is for a wheel bored on our mill at Cleveland to fit with precision an axle turned taper at some other shop. My preference is a straight wheel fit. I think it is better and not so liable to burst the hub as taper fit is."

The next letter was from Mr. U. H. Kohler, the Master Car-Builder of the Wabash, St. Louis & Pacific road :

"*L. Garey, Esq.:*

"Dear Sir: Replying to your favor of March 11, relative to the subject of turning a wheel fit, will say that in my opinion a straight wheel fit is the best. My reason for this is as follows: If a wheel is pressed on straight it may be moved and not become loose on the axle. If the wheel is moved on a taper fit it is likely to become loose on the axle. My experience has been that a straight wheel fit is superior to a taper fit."

Several other letters were also read, some favoring the stright fit and some the taper. Among these may be mentioned one from Robert Miller, Master Car-Builder of the Michigan Central; one from William Forsyth, of the Chicago, Burlington & Quincy; one from W. B. Snow, of the Illinois Central, and one from Wm. McWood, of the Grand Trunk.

C. A. Smith: My impression is that wheels properly fitted either way is right, but I am still of the opinion that a taper fit is the only proper fit for a wheel. Take a wheel with a hub, say of 7 inches. Make it straight; make the hole in the wheel straight; commence to push it on before it is through the end of the axle next the journal that it is going through, it has pressed itself down smaller than any other part of it, and you really get the fit on the inside part of your hub when the outside is smaller. The axle, being softer metal than the hub of the wheel, it will compress itself, and the diameter is smaller as it goes through and that part that travels less in the hub will be the only part that is tight. For years I had wheels fitted with a taper fit of 64th, and it was the exception that we ever had a loose wheel. You can always get a better taper fit, a truer one, and there is no danger of your wheels shoving off inside if you don't have a shoulder behind. Two years ago, one of the most disastrous railroad accidents that has happened occurred from a wheel slipping inside. It had a straight fit, the wheel got loose and went inside and over to the next wheel.

Mr. J. S. Lentz : The Lehigh Valley road has always preferred the straight fit.

Mr. Whitney : It seems to me that independent of any questions as to which are the best, there is an economic question as to the desirability of a uniform fit, whatever it is. The great majority of the wheels and axles under cars are furnished by those who use the straight fit, and when they come to be replaced in railroad shops the same kind of fit would be necessary; otherwise they must have both straight and taper, which would be apt to make confusion and unnecessary expense. Whichever way the majority goes it would be well for the minority to go also, in order to save additional expense.

Mr. L. Garey : I would call your attention to Mr. Miller's boring-mill, with which he bores his wheels. It appears to me that by the evidence we have he is most decidedly in favor of straight fits. The experiments that have been tried show that there is a serious difficulty in pressing the wheels on at a certain pressure to gauge with a taper fit. Another serious objection would be where wheels are purchased of different manufacturers, the metal would vary in density and if fitted by taper fit, by rule, it would be impossible to place the wheels to gauge at the same pressure where they were hard and soft, being bored the same size and axles turned the same size by rule. It is evident from the practice of the gentlemen that we have heard from, that they can be fitted both ways and run without becoming loose. It is shown that if the wheel should become loose with taper fit it would require only the movement of a very small fraction of an inch on the axle to become very loose, whereas it could be moved an inch or more with the straight fit, and still be sufficiently tight upon the axle not to revolve when the brakes were applied, evidence of which I have seen within the past few months. It is very essential that the fit should be uniform throughout the country, whether it is straight or taper, and I am inclined to think that those in favor of a taper fit who will carefully examine the diagrams presented here, will be convinced that taper fitting ought to be out of date, and that straight fits should be the universal custom. The question I asked in refererence to the weight of whee's still remains unanswered. It is certainly a very important one, especially with respect to cast-iron chilled wheels. If the wheels now in use weigh too little for the service it is high time that more metal was added in order to make them not only more serviceable but less liable to crack, especially in the plates. so that we would feel as though we were not compelled to use the steel-tired wheels under our freights at least.

Mr. Whitney : I have nothing to say on that subject, but will present a few figures in reference to the proportion of wheels that break. About a year ago the *Railroad Gazette* made some statements in which it was assumed as a possibility that 5 per cent. of wheels broke every year. These statements have been copied in an English paper—*The Engineer*, I believe—and recopied in this country as an actual fact instead of a mere hypothesis. We have a good many estimates and scattered data, but the fact is that no wheel-maker has an opportunity of knowing exactly what his wheels do on any one road, still less on all roads, and companies do not generally note all the particulars in regard to any one wheel. It occurred to me there was an opportunity to get at certain facts which would cover both points. Take a wheel that is at least a reputable wheel, and a railroad company that is at least a reputable company, and find out exactly what that wheel would do in all of the different kinds of service on that road. The only one I had an opportunity of getting at will probably meet both of these conditions. It was the Pennsylvania Railroad Company. They remove from 125 to 400 a day. They keep a very elaborate account as to the wear of such wheels and breakage, and I have had an opportunity to examine their figures, and have made up a little digest of them. These are the returns of the wheels made at Altoona and drawn during 1883. The total number is 20,306. That is certainly a sufficient number to get some data from. Of 33-inch passenger car Pullman wheels there were 9 broken in various ways, 64 worn out (flange or tread), 72 spoiled in the chill and one under the head of miscellaneous. In all 146 were taken out for defects of various kinds. Those 146 had an average mileage of 69,596. There were 6,468 taken out for flat sliding. Those fractured were 1 per cent. of the whole number drawn, that is 9 wheels were fractured, 8 burst in the hub, and 1 in the rim or plate. Of the 33-inch baggage, express and postal car wheels, there were 2,484 drawn, 1,192 were taken out for flat sliding, 820 for defects, and the average mileage of these was 64,077 miles. Six of the whole number were broken, 289 were worn out and 15 miscellaneous. The next were the 33-inch combination car wheels, 7,998 wheels were drawn, of which 4,456 were taken out for flat sliding, and 1,303 for defects. Of these defects 63 were broken, 596 were worn out, 586 spoiled in the chill, and 56 miscellaneous. Of 30-inch passenger car wheels 363 were drawn, 123 were taken out for flat sliding, and 161 were for defects. Of these defects 2 were broken, 127 worn out, and 32 spoiled in the chill. Of 30-inch freight engine wheels 390 were drawn, 46 of which were taken out for flat sliding, (12 per cent.), and 280 for defects. The average mileage was 49,212. Of these defects 4 were broken, 216 worn out, and 58 spoiled in the chill. There are a number of others which I will not take the time to read. The total shows 1.1 per cent., being 230 wheels cracked and broken out of 20,306. The largest number is for flat sliding. I think that is the first thing that strikes us in any such examination as this. The chief and great trouble with wheels is the wear, and not the breaking. Probably about one half are taken out for flat sliding. Next to that come the worn out wheels, which are about half as many as flat sliding, and then those spoiled in the chill (a little less than 3,000), and then comes fractures, the smallest amount of all. The wear in the small wheels is very much in the flange, showing that the flange wear is very great in those wheels which I suppose are leading wheels in the train. I would say in regard to this statement that as these are wheels made by the company for their own use, it might be supposed they would be biased in their figures by favoring their own manufacture; but these reports were made up entirely for their own use, and the inference is that they are designed for the improvement of their own manufacture in order that they may discover where the defects are. From engines and passenger cars the cracked wheels taken out during the year, of all makes, were 98, broken 121. These of course are pretty much their own wheels. On freight cars the total number cracked was 2,774, broken 386. Cracked of all kinds, 2,872, broken 507. Now, referring to the 5 per cent. business, the question comes up as to the percentage, and what proportion these wheels are of the whole of a certain number. In regard to that I only undertake to follow the figures when the 5 per cent. calculation was made. Taking the same method of calculation the engines and passenger cars on this road (December 31, 1882) by Poors' Manual, had 19,506 wheels under them. The total number of cracked and broken, according to these figures, will make on that basis 1.1 per cent., which is the same as given with Altoona wheels. But of those the broken wheels were 0.6 of 1 per cent., the cracked wheels 0.5 of 1 per cent., and these cracked wheels do not generally cause an accident. Twenty-one wheels out of 19,506 I think these figures are more reliable than the hasty estimate made a year ago, which has gone abroad and throughout this country, representing the wheels universally made in this country as unsafe. The wheels made at Altoona, I should say, are made of charcoal and of anthracite irons and steel.

Mr. Garey wanted to know the weight of the 33-inch wheels used by the Pennsylvania road.

Mr. Whitney thought it was 525 pounds.

Mr. Brady said the vital point was to ascertain just what the wheels cost that the Pennsylvania road was using. They were not cast-iron wheels. They might be called steel wheels ; and he wanted to know at what price they were charged at in the shops, so the iron-wheel men and steel-wheel men could know just what the road was getting their results from.

Mr. W. R. Ellis : In England there are not as many causes for the removal of wheels as in this country, and there must be some reason for it. Among the various causes on our roads was breaking at the hub in forcing the wheels on, defective plates, soft spots in the tread, etc. Among the causes of removal in England was the wearing out of tires, and this appeared to be the principal cause at present.

Mr. Whitney asked if brakes were applied as freely in England as they were here, and on steep grades; and is there a brake on every wheel.

Mr. Ellis said he was unable to reply definitely.

Mr. Brady: Regarding the service of wheels abroad, a gentleman who has labored very zealously in the cause of railroad interests for many years, has given the subject very careful attention, and I gave him some assistance in looking into the matter and the data obtained came from what is known as the Board of Trade reports. Fortunately for England, and unfortunately for ourselves, they go into the subject of investigating railway train accidents more thoroughly than we do here, and as a result they have fewer accidents. Attached to the Board of Trade, they have a Board of Inspection, and to them is delegated the duty of investigating accidents. If my memory serves me right there were 1,629 wheel failures reported, of which only one was reported as broken. The fact that out of 1,629 wheels removed from all causes, only one was taken out on account of being broken set this gentleman and myself to thinking, and it was some months before we learned that abroad they do not consider a wheel broken unless a piece flies out or is taken out. In that same ratio, we would have very few broken wheels in America. In reference to the statement made of wheels never failing from any other cause except the wearing out of tires I have no desire to discuss the matter further than to say that the Board of Trade reports for 1882 give the various causes why these 1,629 wheels were taken out, and I suppose preceding and succeeding reports will give the same information. This I do remember, that 10 of the wheels removed were reported as having had the tires fly off their centers. If we had in this country what they have abroad—a system of reporting all failures and train accidents—perhaps in the course of the next few years we might reduce it down to a minimum. As it is now we have a maximum.

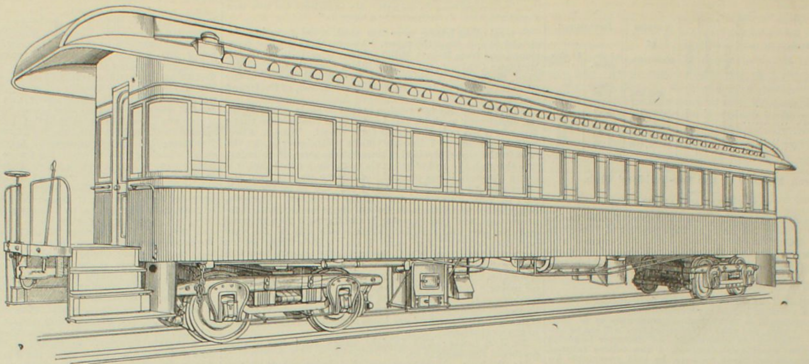
Mr. Neale : A wheel is reported to the Board of Trade when it is considered unsafe to run ; that is to say, if the tire has a crack in it 1¼ inches long it is reported to the Board, and the tire is then removed. It certainly does not wait until a piece falls out before reporting it.

Mr. Brady : I said that abroad it was not the custom to report a wheel as being broken unless a piece fell out, broke out, or was taken out. The 1,629 wheels that I referred to were reported by the various railways as having been removed for various defects.

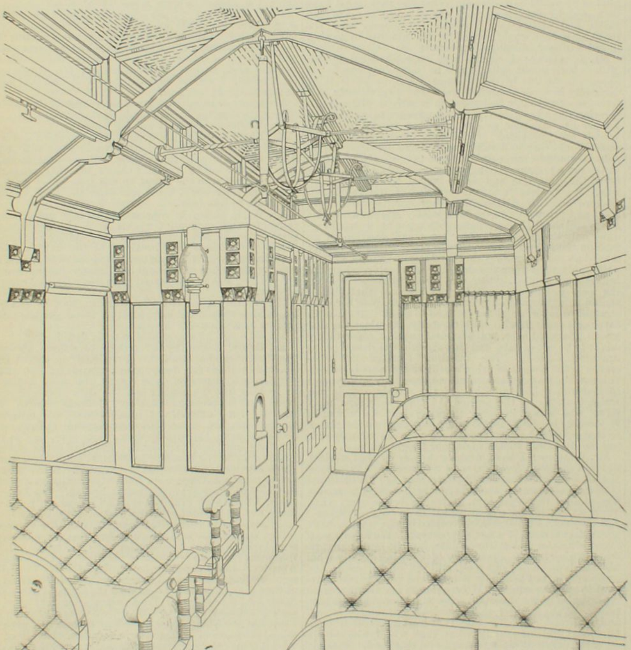
Mr. Neale : I do not doubt the statement at all. But what is meant by the failure of the wheel ? In fifteen years we never had to remove for a defect any tire or axle on a passenger vehicle. We had 3,000 passenger vehicles, cars and passenger and baggage vans. In regard to the freight cars, the great majority built were private cars, roughly and cheaply built and very badly looked after, and nearly all the failures of tires took place on these private cars. You have nothing like it in this country.

Mr. L. Garey, referring to the fact of the small number of wheels called Pullman car wheels cracking, suggested that it might be due to their being heavier than the ordinary wheels. From 80 to 95 per cent. of wheels removed in this country are simply cracked wheels.

PASSENGER CAR CONSTRUCTION—PHILADELPHIA & READING RAILROAD.



Side Elevation, Showing Heaters and External Finish.



Inside of Roof, Car End and Saloon.

The March number of the CAR-BUILDER contained several engravings illustrating the construction of, the new passenger coaches of the Philadelphia & Reading road. We now insert a cut which was crowded out of our last issue, giving a perspective view of the inside of the roof and end of the car with saloon. This, in connection with the cross section, as shown in our last number, gives a very good idea of the peculiarities of the roof construction of these cars. We also give a perspective view of the exterior, showing the style of paneling and the position of the two heaters under the car body.

In respect to this method of heating, it is well known that for a number of years this road has used no stoves in its cars, but in their stead box heaters are attached to the floor timbers underneath, and the heated air conveyed from them into the car. In this way, by having the fire outside instead of inside, the danger to passengers in case of collision or overturn is very much lessened. The heater or furnace consists of a square box, with the usual doors, grates, and outside casings through which the cold air is conveyed to an exterior non-conducting case to prevent the loss of heat by radiation.

Fig. 1 is a side view, showing the heater and coal box with their attachments. Fig. 2 is a cross sectional view of same; and Figs. 3 and 4 are sections of the fire box with its casings. In Fig. 1 *H* is the coal box, which is hung like the fire box from the car body by light iron rods. *D* is the pipe which receives the cold air taken in through the hoods *K K*, these hoods being essential in order to maintain a circulation, and without which the opening of windows and doors would reverse or neutralize the draught and prevent the warmed air from entering the car. In order that there may be an influx of cold air when the movement of the car is reversed two valves *M M* are placed between the hoods and the cold air pipe *D*. These valves are placed at a slight angle, but not enough to impede the draught, so that when they are at rest both are closed. This prevents any undue cooling of the car when the doors are opened at stations. *O N F* represents the draught pipe, which is continued to near the end of the car and from thence to the roof. The portion *O* is of cast-iron, *N* is an ordinary flat or oval sheet-iron pipe, and *F* is in the car itself, and forms a part of the heating surface. *E* is the vertical warm air flue, which communicates with the horizontal one running the whole length of the car just inside the truss-plank, wit openings *L L* under each of the seats. Over these openings is placed a V-shaped piece of sheet-iron or zinc, which delivers the warm air the whole length of the seat, throwing it downward over the passengers' feet on the foot-rests. The work of keeping up the fires in the heaters is comparatively easy, a coal and ash-cart being provided for this purpose at the stations, and by wheeling it along the platforms one person can replenish the coal-boxes and take away the ashes.

Luxurious Cars for the Argentine Republic.

The Harlan & Hollingsworth Co. have recently completed two magnificent cars for the Government of the Argentine Republic. One of them is intended for the private use of the President of the Republic, and is thus described in the Wilmington (Del.) *Morning News:*

The whole frame-work or superstructure of the car is of iron made of channel and I-beams cross-blocked with iron tubes. Even the platform frame-work is of iron instead of wood, as in ordinary cars. The coupling is of the American system of ordinary draw-bars of wrought iron. The running gear consists of first-class four-wheeled trucks, with 36-inch Paige steel-tired wheels, French's elliptic and coil springs, and the ordinary hand brakes. The whole exterior of the car body, both frame and panels, is built of solid San Domingo mahogany and presents a most striking appearance. On the center panel is emblazoned the coat of arms of the Argentine Republic. The device is a pair of clasped hands beneath a liberty cap on the top of a small staff, and is surrounded by a wreath of South American laurel, and on either side are stands of seven national flags of the Argentine Republic, while two cannon form the base, and a representation of the rising sun surmounts the whole. The execution of the design is very artistic. The letter-boards on the sides contain the words "Ferro Carril Andino."

Both platforms are enclosed at the sides with solid mahogany paneled doors, which can be closed against the ends of the car, leaving the platform open or enclosed, making a safe compartment with open ends for observation.

The different compartments of the car are finished in solid woods, mahogany, cherry and oak, richly carved by hand. The ceilings are of oak, elaborately ornamented with gold bronze and colors inlaid with carved panels and bronze plaques. The deck lights are of embossed glass in pivoted sash, and around the base is a border of "Wall of Troy" in marquetry. They are protected by brass wire cinder screens on the outside. Pendant from the ceiling are elaborately ornamented double nickel-plated chandeliers, while single bracket lamps of similar style and design are placed in the various compartments of the car.

The floor of the entire car is of cherry and maple, and is covered with carpet of the richest Axminster. The windows are unusually large, with double mahogany sash, each containing a French plate glass 34x34 inches. They are fitted with spring roller curtains and curtain lambrequins of tapestry, lined with Florentine silk, hung on mahogany poles. The ends of the cars and all of the bulkheads are richly carved by hand, many of the designs on the panels representing different varieties of birds and water fowl, being superb specimens of artistic skill. All the metal trimmings are nickel-plated.

The vestibule occupies one end of the car. It has beveled plate glass mirrors in the end and a large plate glass panel in the end door. Its furniture is upholstered

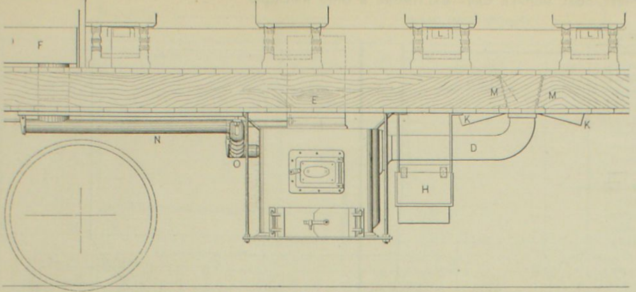


Fig. 1.—Side View of Heater and Attachments.

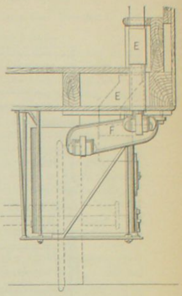


Fig. 5.—Sectional View.

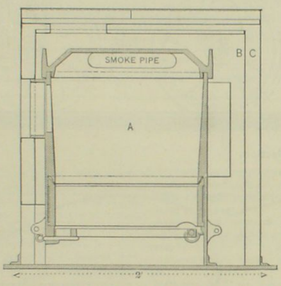


Fig. 3.—Section of Fire Box.

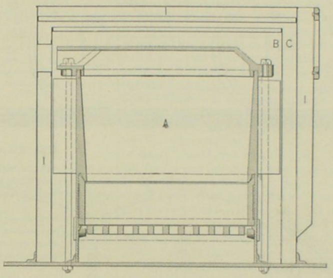


Fig. 4—Section of Fire Box.

in cherry plush, the seats on one side being similar to those in the Pullman sleeping cars without the upper berths and calculated to form a lounge or bed whenever needed. On the other side are placed a mahogany card table and solid mahogany chairs, richly carved and upholstered in plush. The entrance from the vestibule to the grand salon is through a double swinging door in the bulkhead, which contains a panel of richly embossed glass. This compartment is one of almost Oriental luxury. The bulkheads, sides, and all the paneling being most elaborately carved and the oak ceiling inlaid with costly carved panels and bronze work. It contains five beveled plate mirrors, the largest being four feet square. The blue tapestry curtains, in addition to the rich lining of Florentine silk, are hung with silk tassels.

Among the articles of furniture are a pillow sofa upholstered in rugs, with dark plush borders, two pillow-backed arm chairs and two side chairs, upholstered in the same material, two carved mahogany chairs and folding camp and reception chairs, with the same upholstery. Axminster hassocks, a mahogany dining table, with a handsome cover, mahogany card tables, with a small side table of material containing a silver water service, jardinières for flowers, etc.

Next to the salon is the President's state-room, containing a permanent bed, supplied with a mattress and mattress spring, bedding, blankets, counterpanes and a spread and pillow shams of white hand-made lace, lined with cherry silk and ornamented with the monogram of the Argentine Republic in the center of each. It is hung with Turcoman curtains, and has drawers beneath for bed linen, personal underwear, etc. Opposite stands a handsome mahogany secretary and carved back mahogany chairs, upholstered in rugs and plush. All the furniture is supplied with linen covers. It also has a large beveled glass mirror. The entrance is through a sliding door opening into the passage-way which leads from the grand salon to the platform at the opposite end. Adjoining the state-room is a private toilet-room furnished in solid oak, with a wardrobe with beveled mirror glass panels in its door. It is fitted with other mirrors, marble-top wash-stand and bath-tub, which are supplied from a large water-tank beneath the car by means of a nickel-plated hand pump. The bath-tub has a hinged lid, which, when closed down, is found to be upholstered with cherry plush cushions to form a luxurious seat or lounge.

The end of the car contains the gentlemen's saloon, with marble lavatory and a variety of closets for ice supplies, etc. The refrigerator and tool-box are placed beneath the car.

Standard Screw Threads.

The *Scientific American* speaks of the difficulty of procuring the general adoption of the United States, or Sellers, system of screw threads, and attributes it to dissatisfaction with the system itself.

"It is hard," says the writer, "to establish a uniform, absolute system in screw threads. Every mechanic can readily see how different are the demands on a bolt on which the nut is set up to stay, and on one that is to be used for adjustment. It makes a vast difference in 'setting up a nut on a bolt of 2 inches diameter with the standard pitch of $4\frac{1}{2}$ to the inch and on another of the same diameter with a thread of 6 to the inch.

"But beyond special needs, the standard is objected to by many mechanics because of the lack of proper relation between the diameter and the pitch, particularly on diameters below one inch. The advance in diameters from $\frac{1}{4}$ of an inch to the full inch, is by sixteenths of an inch, and the pitches, beginning with 20 to the inch and ending with 8 to the inch, are 10 in number. A $\frac{5}{8}$ bolt is cut to a 16 thread, which greatly weakens the bolt by its depth—much more so than an 8 thread can weaken an inch bolt. Complaint is made that a $\frac{1}{2}$ inch bolt with 13 threads will twist in two before it will strip, and that a $\frac{3}{4}$ bolt is ruined by cutting it 11 threads to the inch.

"Our standard is very similar to the English, or Whitworth, standard, having 21 pitches for 29 diameters, while the Whitworth has 18 pitches to the same number of diameters. Up to one inch the relations of pitches and diameters are the same, with the exception of the $\frac{1}{2}$ inch bolt, which by United States standard has 13 thread, but by the Whitworth has 12. In estimating the relative strength of bolt and pitch of thread, reference must be had to the form of thread. Beyond dispute, the Whitworth is the strongest thread yet produced, as much above our modified sharp V thread, called 'standard,' as that is above the old V-thread itself, and more. Its rounding, or convex, bottom is never inducive to fracture. If it was not so costly to produce, it would take the place of our square bottom thread for all general purposes. Some of these objections against the standard will appear to have more than prejudice for their foundation, at least for some uses, by a comparison between the threads and diameters and a consideration of the hundreds of different purposes to which they are to be applied."

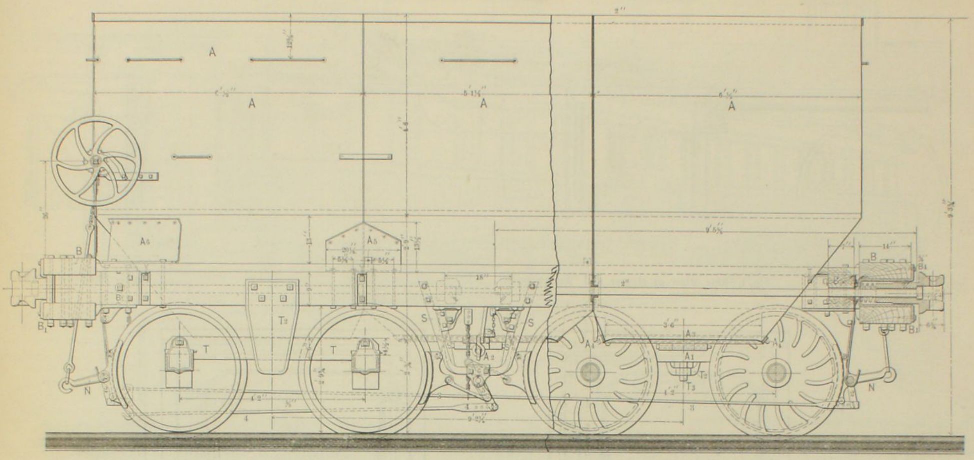
[That the so-called United States standard is not perfect is admitted by all who are familiar with it, but its superiority to any thing else that is likely to come into common use is so great that we may well be content to take it as we find it and use it as best we may. In the article above quoted the Whitworth system is spoken of as if it possessed advantages over the U. S. standard that were worth having; but the writer forgets that what he criticises the U. S. thread most severely for is worse in the Whitworth. For example, the $\frac{1}{2}$ inch screw in the U. S. standard has 13 threads to the inch. This is, as he says, rather too coarse; but 14 threads would put the thread rather too far out of the system to allow it to be adopted, and so it was thought best on the whole to take 13. The Whitworth $\frac{1}{2}$ inch bolt has only 12 threads to the inch, a number which Mr. Whitworth admits is too small, and that the threads are too coarse and cut too deeply into the metal. While the round-top thread is very pretty to look at and work with, it is not so cheaply made, and is commercially not so desirable as the less perfect but more practical V-thread. One thing is very much needed, and that is a good system that is applicable to the smaller sizes of bolts and nuts, say from $\frac{5}{8}$ down to the smallest sizes that are used in model work. Neither the U. S. standard nor the Whitworth is applicable to these purposes, as the pitches which would be obtained would be so large that the screws could not by any possibility be used. Considering the fact that a reasonable degree of uniformity has at last been attained, and that we can now call for a screw from one manufacturer and a nut from another, and get a working fit, it is hardly worth while to complain of the faults which we all know exist in the standard. A little less science and a little more attention would have given us a closer approach to what actual practice calls for; but this is not worth talking about now, unless the railway world is prepared to abandon the results so far obtained and decide upon an entirely new standard—a thing which is not probable. What *is* worth doing, however, is to appoint a commission to look after the threads that have not yet been brought into any system, and see if something can not be done toward uniformity. It is evident to all who have given the subject any attention, that several systems are absolutely necessary in the mechanic arts, and that one system can not be made by any amount of argument to meet all requirements. The faults of existing systems can be met, as is now the usual custom, by enlarging the ends of the rods. This is not very scientific, but it is the practical way out of the trouble. Lock-nuts are used to compensate for the want of the better holding power which the fine threads would give, and which, of course, would be very desirable, but it must be remembered that no other standard now in use would be any improvement upon our own.

The Whitworth pitch has several disadvantages that have caused great trouble, and it is on record that at one time it got wrong in Whitworth's own establishment, and it was more than a year before it could be got right again, owing to the difficulty of restoring the original standard. It is a wise maxim to let "well enough" alone. Past experience, however, may be profitable as a guide in case it is thought desirable to attack the problem of new standards for screws not provided for in the standards we now have.—ED. CAR-BUILDER.]

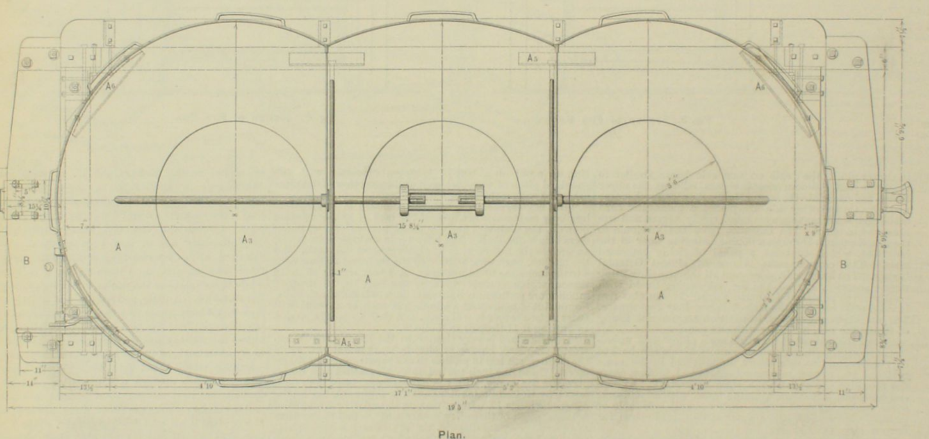
IN a brief paragraph in our last issue we stated that the New York, Lake Erie & Western road was putting steel-tired wheels under its passenger cars as fast as practicable. We should have said that they were Allen paper wheels, of which nearly 700 have thus far been furnished to the road. The Delaware, Lackawanna & Western now have some 2,000 Allen wheels (33-inch) and are now about to use them on their side lines, their through cars being equipped with 42-inch wheels.

EIGHT-WHEEL COAL HOPPER CAR—BALTIMORE & OHIO RAILROAD.

Capacity 40,000 Pounds.



Side Elevation and Section.



Plan.

The coal-hopper cars of the Baltimore & Ohio Railroad differ so materially in their construction from other cars of this class in use on Eastern roads, and, so far as we know, on other roads of the country, that the illustrated description herewith given can hardly fail to attract the attention of car-builders.

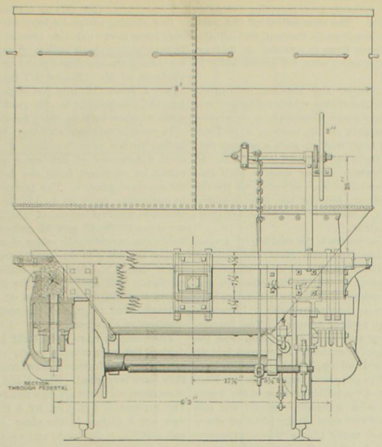
The hoppers consist of three sheet-iron shells, with conical bottoms, carried upon a frame which rests on two four-wheel trucks. They are cylindrical in plan, but are separated by partitions which cut off portions of each cylinder so as to make the plan oblong, as will be seen by reference to the drawings. The side and end views show the arrangement of the conical parts or hoppers, which open between the axles, and which can be dumped independently. These hoppers *A A A*, are carried upon the frame by means of the brackets A_5 A_6, which are made of half-inch iron. The cylinders are of iron about ¼ inch thick. The frame consists of two side sills 6 inches wide by 9 inches deep, which are connected at the ends by four end sills *B* and B_1. These sills are 11 inches wide on the ends and 14 inches at the center, and are finished up 4½ inches thick. They are of the best-selected white oak, and are held in place by two 7-inch bolts, which go through both sills, and the side sill also. There are, in addition, on each side sill a pair of bracket castings to support the end sills. These are bolted by ½ bolts. As the main sills are on a line with the draw-bars, no draw timbers are needed, the draw-bar itself going directly between the end sills, where it is held in place by the strap shown in the side elevation at B_4 at the right-hand end. This forms the spring pocket and takes the strain of the buffing. Just inside the end sills a 7 by 9 inch timber connects the side sills and is held fast by a pair of bracket castings and a number of through bolts, thus forming a supplementary end sill. This serves to stiffen and reinforce the frame. The drawgear is of the simplest design and has long been in use on the road. It is continuous and very strong and is furnished with cast-iron draw-bars. The draw-rods are 2 inches in diameter, and at the center are keyed into a swivel or coupling shown in the center of the hopper in the plan, and also in line with the sill in the side elevation. In case a spring shuts up or any severe collision disables the draw-bar, the rod is free to slip back into the swivel without bending or crippling. This simple modification of construction has been used for twenty years or more with eminent success, the proportion of draw-bar repairs being unusually small. Owing to the fact that the hopper bottoms and their doors take up nearly all the space between the axles, a truck of the ordinary form is out of the question, and it is equally impossible to use a brake with a beam crossing the wheels.

The trucks are of a pattern devised by Mr. Ross Winans, and have several peculiar features. They are without frames, have what may be called equalizers, and two king-bolts for each truck. These bolts, or, more correctly speaking, "pedestal pins," form the fulcrum about which the spring-plates move, both in passing over irregularities in the track and in passing around curves.

Each axle, it will be seen, is free to move in a vertical direction, and it is also free to move endwise; a modification of this end motion seems to enable the axles to become approximately radial when passing curves.

The journal-boxes are of the ordinary pattern, but have two equalizers, or "spring-plates," resting upon their tops. A couple of bolts, through lugs on the top of the casting, hold the plates in place and permit of a slight motion parallel to the track, similar to that of a box in a suspension truck. The two spring plates carry between them, at their centers, a spring pocket, on which rests a 10-in. rubber spring. The spring and plates are held in position by the pedestal T_2, through which the king-bolt, or pedestal pin T_3, passes. Slackness of the parts and the elasticity of the springs allow the boxes to rise and fall independently, and to move endwise sufficiently to pass curves with ease. This construction is so radically different from any used elsewhere that we took some pains to watch the operation on curves and when passing frogs and switches. The motion of the trucks, even on the shortest curves, was apparently as easy as that of a passenger car truck. Their long service and good performance certainly commend them to the attention of railroad men.

The arrangement for dumping consists of three circular doors held by a hook, shown at A_2 in the side elevation and end view, or more essentially, of a link with a shank bent at right angles and passing through a square hole in a bar called a door-strap iron. A key holds the latch in place. As the wheels are spread but 4 ft. 2 in., and as the



End View.

doors are 3 ft. 6 in. in diameter, there is very little clearance between them and the axles when they are dropped.

This construction necessitates the peculiar form of brake which has been adopted on these cars, and which was designed by Mr. A. J. Cromwell, the Master of Machinery of the road. The cars were originally intended to carry a load of 10 tons. The hoppers being lower and of less diameter, brakes were applied on four of the wheels and worked very well. The loads of the old hoppers, however, were finally increased to 13 tons. When the load was increased to 20 tons there was too much slipping, the brakes being unable to hold the cars. As brake-beams were only possible at the ends of the car, putting the brakes on all of the 8 wheels was a difficult thing to do, but it was done, however, in quite a simple manner. A bell-crank *N*, on the iron brake-beams at the ends of the car, takes the place of the ordinary brake lever in applying power. The lower arm 2, furnishes the pulling power on the brake rods 3 and 4. The rod 3, transfers the power from one outside wheel to the other, while the rod 4, brakes the two central wheels through the floating lever 5. This lever is carried by the casting 6, and to its ends are attached the links which apply the brake shoes. The block 6 is supported by the stirrup *S S*. One of these is bolted to the sill of the car, and the other is fastened to a casting on the under side of the sill. The fulcrum block 6, has a motion on these stirrups by means of slotted bolt holes; consequently, when pressure is applied to the lever, whichever shoe strikes the wheel first forms the fulcrum, and the parts slide until the opposite shoe takes an equal bearing. All the links are formed by punching out the ends of flat bars and turning them off to form double eyes. The brake is a very ingenious device, and has worked in a very satisfactory manner since its first application.

DIMENSIONS.

Length outside of Buffers	20 ft.	10½ in.
" " End Sills	19 "	5 "
" " Hopper	17 "	2½ "
Width outside of Side Sills	6 "	9½ "
" " Hopper	8 "	0 "
" " Foot Boards	8 "	¼ "
Diameter of Hopper Door	3 "	6 "
Height from Rail to Top of Hopper	9 "	3¾ "
" " " Angle	4 "	10 "
" " " Door	2 "	¾ "
" " " Top of Side Sill	3 "	7 "
" " " Center of Buffer	3 "	2 "

FINISHED SIZES OF TIMBER.

8 Side Sills, Georgia yellow pine	19 ft. × 6 × 9 in.
2 Foot Boards, "	17½ " × 2 × 7½ "
2 End Sills, white oak	6½ " × 7 × 9 "
4 End Timbers, white oak	7¾ " × 4½ × 14 "
2 Brake Blocks, "	3½ × 6½ × 6½ "
4 End Coping, "	4 ft. 7 in. × 2 × 18 "
4 Side " "	2 ft. × 2 × 8 "
2 " " "	3 ft. 4½ in. × 2 × 8 "
4 Corner Pieces, "	2 " 3 " × 2 × 10 "
8 Dust Guards, poplar	8¾ × 6 × ½ "

IRON (IN PART.)

4 Pedestals. No. 26—cast	715 lbs
4 Saddles, " 30— "	180 "
8 Knees, Corners of Frame—cast	139 "
2 Draw-Bar Rods—wrought	210 "

CONSTRUCTION.

The axles are M. C. B. standard, except center of axle, which is 4½ inches in diameter; the finished weight to average 390 lbs.

Spring casting is placed on lateral spring plates central between wheels, and held in position by one countersunk bolt; the spring resting on casting.

Pedestals are bolted to sill by four ¾-in. bolts 8½ in. long. Pedestal castings project under sill which rests on spring through which a 2-in. pin 20 in. long passes through pedestal spring, spring casting and bottom of pedestal, keyed at bottom of pedestals.

Cast-iron draw-bar lips project top and bottom 2 in. From lip to face of draw-bar 6¾ in. Draft-rod continuous with swivel in center and head on end at draw-bar. Draft-rod head 3¼ in. square, 2 in. thick. Turn-buckles 18 in. between cast ends, which are 2½ in. thick, the two rods which pass through castings 1¼ in. round riveted ends. Keys for draft-rods 3 × ⅝ in. thick, 4 in. at top.

Draw-bar springs 6 in. diameter, 2¼ in. hole, 2-coil round bar; capacity 16,000 lbs. with ⅛ motion lift. Material, best crucible steel. Pedestal springs of rubber. 10 in. diameter, 6 in. high, 2¼ in. hole, and to compress not more than ¾ in. under 16,000 lbs.

Side sills framed on end sills with double tenons. Foot-boards 2 × 7½ in. run on top of side sills between end timbers, secured to sills by four cast brackets each side.

Hopper pot of best No. 10 flange iron; sheets riveted with ¼ × ¾ rivets, each sheet to lap ⅝ in. from edge to center of hole. Hopper door 44½ in. diameter, $\frac{5}{16}$ in. thick, hung to hopper by two hinges 3½ × ½, secured to hopper by 4 rivets through each hinge and sheet; door hinges 6 × ½ in. secured by 4 rivets ⅝ × 1¾ in. Hopper secured to frame by 4 side and 4 corner braces, with six ½ × 1½ in. rivets. Center brace secured to side sill by four ⅝ × 10½ bolts.

Top of hopper made of No. 11 refined iron sheets riveted together with $\frac{5}{16}$ × ⅝ rivets, single lap; to have 12 long handles 18 in. long, and 2 short ones 10 in. long.

The wheels are 33-inch, double-plate, weighing not less than 565 lbs., and guaranteed for three years.

WEIGHT OF IRON.

Refined iron	1,739	lbs.
Flange "	1,810	"
Cast "	2,889½	"
Rivets	69	"
Nuts	60	"
Bolts	206¾	"
Washers	16½	"
Key bolts	18¼	"
Brasses	104	"
4 pair wheels	4,520	"
4 axles	1,560	"
Wrought iron	2,1[illegible]8	"
Nails	2	"
Draw-bar springs	33	"
Rubber springs	120	"

[Our next issue will contain some further illustrations of this car, showing perspective views of ex'erior.]

"Do you see that trunk, sir?" demanded an indignant traveler of the baggage agent at the terminal section of a western road, as he surveyed a demolished packing-box to which a check was hanging that corresponded with one he held in his hand. "That trunk is ruined, sir, and I demand damages." "Yes, sir," said the smiling agent; "you ought to have pay for that trunk. People get a tender little trunk like that and pack it up for a hundred miles' journey as if they were going to the Pyramids. They put in two or three good-sized hams, a crock or two of apple-butter, a sack of double-X family flour, ten or fifteen pounds of nails, a few pounds of shot, new castings for a couple of plows, and three or four changes of clothing. Then they lug it down here at the last minute with the handle burst off one end, and expect it to go through easy enough to allow a horse-fly to ride on the end."

Communications.

The Painting of Passenger Car Trucks.

To the Editor of the National Car-Builder:

Although I am not a car painter, nor an adept in the chemistry of pigments, oils and mixtures, I have nevertheless become impressed with the idea that there is a right and a wrong in the matter of car painting, and in this general proposition I think that most car builders and car painters will agree with me. In respect to the bodies of passenger cars, it can not be said that there is any prevailing color, the tints and shades ranging all the way from a delicate straw to Pullman color, according to individual taste and preference. There is also a question of utility involved, about which there is less diversity of opinion as to how car bodies should be treated in the paint shop. But it is with respect to the *trucks* of passenger cars, more particularly, that I wish to offer a few suggestions.

It seems obvious that if there is a choice between good and bad color for car bodies there ought to be a siimlar choice as to the color of trucks. Going through a car shop the other day I came across three passenger cars that had just been completed, all of them radiant with paint and varnish. The trucks were particularly noticeable from the fact that with the exception of wheels and axles they were painted a bright red. One car had six-wheel and the others four-wheel trucks, and on making a close inspection it was quite surprising to notice how much better the parts of the red trucks could be seen than those of the other cars in the shop that were painted a dark color. The natural inference was that if there was such a difference between red and brown in a car shop, why should there not be the same difference in a passenger depot where cars are inspected? And if so, why should not the inspection of red trucks be more thorough and any defects that might exist less likely to escape notice? "If the running gear could be white," I said on a first thought. But no. White will not do, for two reasons. White means a bad paint for iron. It also takes on a bluish tint when it gets dirty, and as the mixture of dirt and oil under a car has a bluish tint also there would be no contrast. What, then, is the best paint and color for the iron work of a truck? Red lead, most decidedly, according to the authorities on the subject. Paint the trucks, then, with red lead, which will be the best for the iron and will also enable the inspector to see defects better by the light of his torch instead of belng guided by instinct to a great extent.

Perhaps some of your readers will think I am crazy, but that is of no consequence if my suggestion helps to improve the color of passenger car trucks in the way I have indicated. I am of the opinion that car painting, perfect as it is when compared with the crude work done years ago, is still susceptible of improvement. Bad and unsuitable colors have usually been adopted because railroad men, not being painters themselves, would not take the trouble to find out whether there was anything to be gained in point of economy by using this, that or the other particular color. But if it can be shown that it makes a difference in the cars of two or three months' service, they can hardly fail to see the thing in a different light. It strikes me that the color of car bodies and trucks should be determined on rational grounds, and not from the freaks of fancy, and when it is so determined we shall have light colored car bodies and

RED TRUCKS.

Journal-Bearing Metals.

To the Editor of the National Car-Builder:

Noticing the editorial article in your last issue on the subject of "Journal-Bearing Metals," and as it is a subject to which I have given a great deal of attention during the past few years, I would like to occupy a small space in your valuable paper for the purpose of noting some very important facts in regard to the compositions or alloys that are now used by our numerous railroads. I find from information and practical experience that, with but very few exceptions, railroad companies, both large and small, are running their rolling stock upon any composition, it matters not what, so that it melts and makes a reasonably fair looking casting, and that they continue to do so, expecting to make the best of mileage, with no hot boxes and no detention of trains, all of which is simply an impossibility. If a fund was raised and a committee appointed by these companies (the master mechanics and master car-builders to be represented in such committee), and a thoroughly practical test made of the various compositions and alloys now in use, it would, in my judgment, be one of the best things that could be done in regard to this particular feature of railroad economy and operation. As an interested party, to some extent, and as speaking for others whom I represent, I would endorse such a course and also guarantee to share our proportion of the expense.

To state my views more pointedly, however, I am decidedly of the opinion that the alloys that are in use to-day on nine-tenths of the roads are considerably out of date, *considering the present high rate of speed, and the additional tonnage which is being carried.* Yet we meet at our club-rooms month after month, and almost everything is talked of and acted upon, and no doubt a great deal of progress has been made, but there is but little done with this important question. I had occasion to visit officially some six roads recently, and

having this matter of brasses in mind, I made it a point to inquire of each what they were using, and found as follows, viz.: Two of the roads were making their brasses from the scrap heap without adding any new metal, and boastingly said that they had not bought a pound of new metal in from three to five years. I inquired of them if they assorted their brass, and was answered in the negative. One road was buying composition made up to suit their patterns. They did not know what the component parts were, but were sure it was brass. The others were using some new metal mixed with old composition and lined either with Babbitt or lead. I presume this is a very fair average, and will give you some idea of just what is being done. Now for the scrap heap. I believe that not one third of the metal in service to-day is fit to be used. The scrap heap receives all brasses from foreign cars, and all the old brasses that are furnished by contractors for new cars, and which in some particular cases it would be almost impossible to identify as red composition, or seven to one; but they come under the heading of brass and that settles it. Now, just why roads building cars should accept such material as first-class brasses I am unable to understand. In a majority of cases, the specifications call for a good composition. But do they get it? This I will leave your readers to answer. My individual and personal belief is positively that they do not.

Having made these few suggestions in my crude way, I should be pleased to hear from some others that are interested, and have their experience upon the question of alloys and what is to be the future bearing metal for railroad rolling stock. H.

The Lobdell Car Wheel Co.'s Works.

During a recent visit to these works, at Wilmington, Del., we gathered some interesting particulars in reference to wheel manufacture that are worthy of mention.

Mr. Geo. G. Lobdell, the President of the Company, expressed some views in regard to the life of cast-iron wheels which we think are not generally held by railway men, but which, if more widely recognized, would probably change or modify very considerably the terms of wheel contracts. These contracts as now made guarantee a life of forty, fifty or sixty thousand miles for every wheel, and although it is usually understood by the contracting parties that the wheels in every case must average the stated mileage, yet in the practical working of the contracts the wheel-maker guarantees that every wheel that fails to make the stipulated mileage shall be replaced by a new one. But if the contracts could be made for average mileage based on the total mileage made by all wheels included in the contract the result would be much more favorable to the wheel-makers and the roads would get quite as good wheels as they do now. Mr. Hogeman, the superintendent of the works and formerly master mechanic of the Philadelphia, Wilmington & Baltimore road, also expressed the opinion that the average life of cast-iron wheels is from 70,000 to 80,000 miles. This, at all events, was the average on the above named road for a number of years. But how much of this large mileage was due to the wheels and how much to the trucks is an interesting question. It must be borne in mind that until quite recently the whole freight car equipment of this road was run on passenger trucks. The trucks for freight service were of course somewhat more cheaply built than those under the passenger cars, but they had equalizing beams with springs on them, the usual swing motion, and elliptics that are used on 4-wheel passenger trucks. These trucks were made necessary by the very large fruit trade of the road, which necessitated the easiest possible riding freight car in order to prevent loss by shaking. We may here note the fact that the road is at present gradually adopting an iron frame truck as fast as the other trucks are worn out and destroyed. This will be in the future a cause of complaint from shippers and may in the end affect the income of the road derived from the peach crop transportation.

The durability of these old wooden passenger trucks was well illustrated by Mr. Hogeman's experience when master-mechanic. He had a tender for which he had use, but was unable to finish the iron trucks in season. Going to the freight shop, he took out a pair of ordinary freight trucks and put them under the tender, where they ran for a long time and possibly may still be in use. They performed their work quite as well as the standard tender truck, if not better. So successful, indeed, have these "passenger" freight trucks been that it is a question whether they would not pay in general freight service.

There are at these works some exceedingly beautiful roll-turning machinery of various kinds. Wherever rolls are used which are required to be true and perfectly circular those made at these works are known and celebrated. The lathes are of special pattern and are capable of producing cylindrical surfaces which are perhaps unrivaled in the arts. Few machinists, however, would recognize the extremely solid and powerful pieces of apparatus as being lathes. The chills for the cast-iron wheels are finished in a manner somewhat analogous to the rolls. After being turned to shape they are finished with a tool ground to the full shape or section of the chill. The cut taken is a mere trifle, and perhaps might be better described as a scrape. The tool is put in and kept at work until it will take off nothing more, when the chill is considered finished. The works have recently been receiving extensive additions and alterations. The new offices of the company are well arranged, handsomely finished, and admirably designed. The drawing-room is a model in its way. It is furnished with a fire-proof safe for preservation of drawings, tracings, etc.

The arrangement for printing and washing blue-prints are very perfect, the printing frame, which we believe was first designed by the Pusey Jones Company, is on wheels, and can be moved to any part of the washing or printing room. The frame itself is pivoted in such a manner that it can be turned to any angle and fastened in position. In printing it is wheeled through a door upon a platform, turned toward the sun, and the frame adjusted to the desired angle. This, of course, reduces the time required for printing very greatly, a matter of considerable importance during cloudy weather.

Another feature of these works is the making of a valuable cement from the burnt sand from cores, the molding floors and wheel pits. The cement is used in connection with lime to make a hydraulic mortar, the strength and toughness of which far surpass that of any cement we have ever seen before. Common lime mixed with it, instead of sharp sand, is used for all sorts of grouting. The foundations are made by using two parts of the sand from the annealing pits and one part of cement. Brickwork laid up with this mixture is so hard and tough that in breaking it up with a pick it is difficult to get pieces larger than an English walnut. A number of the buildings around the works have been built either with hydraulic cement and this sand or common lime and this sand, in the place of sharp sand. There are a great many places where extensive foundations are required, in which the increased strength obtained by using core sand would be of the greatest advantage, and our readers who have more or less of burnt sand to dispose of may find it advantageous to use it when putting in brick foundations. From what little we have seen of the cement we should judge that a mass of brick laid up in it would present nearly as much resistance as ordinary North River blue-stone, and considerably more than an equal block of sandstone.

Mahogany and Fine Cabinet Woods.

Among the largest importers and dealers in hard and ornamental woods in New York is the well-known firm of George W. Read & Co., whose mills, yards and warerooms occupy the block at the foot of Fifth and Sixth streets, on the East River. A recent visit to the premises impressed us with the growth and increasing magnitude of the trade. A cargo of the handsomest mahogany we have seen for a long time had just been received, the greater proportion of which had been cut to order. One of the finest specimens in the yard was a log of Mexican mahogany, which had been sawed up into 16 boards, 32½ feet in length and 36 inches wide. The log had originally 24 boards in it, but only a part of them remained in the yard. There were also some 4-inch planks from 12 to 14 feet long, and entirely free from knots, also a stick of very old and finely figured San Domingo mahogany, 5 inches thick, 38 inches wide, and 12 feet long—a very rare specimen, and designed for choice cabinet furniture.

In the drying lofts are some lots of red cedar which are miracles of perfect sawing. Some of the boards are 23 feet long and 18 inches wide, without a knot or shake, and without any perceptible variation in thickness throughout their length and width. From one log we counted ten of these boards and from another twenty. The sawing is simply perfection, and gives a satin finish to the whole surface. The veneers sawed in this way have just tooth enough to hold the glue, while the amount taken off in finishing is a mere nothing.

The boards produced by cutting instead of sawing have almost a perfect finish, the amount of labor necessary to a perfect surface being insignificant. These cut boards and veneers are perfectly flat and smooth, and are dried by a special process which holds the wood perfectly flat while the moisture is being taken out. This is done by placing the wood between two platens under a heavy pressure and then subjecting it to a steam heat that converts the moisture into steam which rapidly escapes and leaves the wood perfectly dry in the course of a few minutes, the time depending on the thickness of the lumber.

The veneer cutting machines can work up to 24 inches in width by 11 feet in length. One machine cuts from ⅜ths of an inch thick down to 90 or more to the inch. Another machine has a range of thickness from ⅛th of an inch down to 100 per inch. An illustration of the difference between good and bad sawing is to be seen in the office of the firm. It consists of a thin board cut from a plank sawn in Mexico. The Mexican side looks very much as though it had been hewn with a dull axe. To say that it had a nap would hardly describe the case. In many places there was a very respectable coat of hair. The Yankee sawing produced a surface like plush or velvet, perfectly smooth and even, the saw marks showing like a regular pattern. There is a figured log of Mexican mahogany in the yard, which is 26 by 37 inches at the butt, and about 22 feet long. When cut up this stick will give somebody an extremely beautiful lot of veneers. In the sample room there is a piece of figured cherry, which is altogether unique in its way and quite a wonder. The only clue which a person would have in guessing the kind of wood is the color.

The location of the establishment is peculiarly favorable, being next the docks where all the imported timber is landed, and so situated that cars can be loaded direct from the mill or yard. A word or two about the retail room, which is probably known to every amateur scroll sawyer in the United States. Here everything is obtainable, from a piece of $\frac{1}{16}$th walnut for a boy to cut up for a match box, to a bundle of the most costly veneers ever sawn.

Crown-Sheet Stays.

(*See cuts on opposite page.*)

In designing boilers for locomotives the master mechanic may learn many valuable lessons from the experience of those who have built boilers of the locomotive type, but for other purposes than for use on railways. Through the kindness of Mr. Charles W. Pusey, of the well-known Pusey & Jones Co., ship and engine builders, of Wilmington, Del., we present to our readers some details of locomotive boilers built by them for marine purposes.

To prevent misunderstanding, we should say that these boilers are not so unlike those of a locomotive in size of shell, dimensions of fire-boxes and pressures carried as might be supposed from the fact that they are intended for use on shipboard. The pressures which they are built to resist vary from 90 to 150 lbs. per square inch. The shells, in the two boilers, of which illustrations are given, are respectively 48 and 63 inches in diameter. The fire-boxes are considerably wider than those of ordinary passenger engines; in one case being 6 × 5 feet, and in the other case 5 × 4 feet. The features which the master mechanic will study with the greatest interest are the crown-sheet stays, the method of finishing the water legs without mud rings, and the methods of putting in the combustion chambers.

These boilers have been built in considerable numbers during the part twenty years, and on account of their satisfactory performance have become favorites wherever they have been used. Figs. 1 and 2 are longitudinal and cross sections through the fire-box of a 63-inch boiler. The fire-box is 6 ft. 4 in. by 5 ft. 3 in. wide. The water legs are 5 inches in the clear on the sides and front, and 8 inches at the back, and are finished with a U-shaped plate instead of a mud ring. This construction is considerably lighter and cheaper than a mud ring would be, and is employed in a large part of the work built by the company. Several of the early locomotive builders in this country employed this construction in the water legs of boilers. One of these we recently saw while it was being cut up, and the only objeciion urged to the construction was in regard to the thinness of the metal at the bottom making repairs difficult. The plan has advantages, though there are objections to its use in some cases. In Figs. 5 and 6 the plate which finishes the water leg is semi-circular in cross section. The width of the water legs enables this construction to be used with great advantage.

The method of supporting the crown-sheet is the salient feature which will attract the reader's attention. The crown-sheet shown in Figs. 1 and 2, 63 by 76 inches, is stayed directly to the shell. There are seven rows of stays, 1¼ inches in diameter, as shown in Fig. 1. Each one of these stays is forked at the bottom where it takes hold of the crown-sheet. There are twelve stays in each row across the sheet, spaced 5 inches from center to center. This arrangement gives a free circulation across the crown-sheet and enables this part of the boiler to be cleaned with ease.

Figs. 3 and 4 are cross and longitudinal sections of the combustion chamber, which is placed 5 feet in front of the fire-box ,with which it is connected by short tubes. This chamber has the feet of its crown-sheet stays placed across the boiler. Here, as on the fire-box crown-sheet, they are of unequal length, and as this inequality has been held by master mechanics to give trouble from leakages caused by unequal expansion, we asked the constructors particularly in regard to this part of the boiler. We were informed that it was only necessary to take care in placing them in order to have the job perfectly satisfactory. The difficulties arising from unequal expansion of the stays, the builders say, are theoretical and are not met with in practice. The crown-sheet of the combustion chamber is on the same level as that of the fire-box.

These combustion chambers are rather novel features. They are sometimes made, as shown in Fig. 7, by riveting two heads inside the shell to form the chamber itself, while to make a connection between the two parts into which the boiler is thus divided, a plate is riveted upon two rings on the outside of the shell. This gives a space *S S*, through which steam and water circulation can be kept up between the two parts of the boiler.

There is a horizontal steam drum above, to which the two parts of the boiler are connected by 12-inch necks. In Figs. 3 and 4 this combustion chamber is formed by two half heads and a crown-sheet. An outside plate is used to make a connection between the front and back water spaces. Fourteen-foot tubes lead forward from this chamber to the smoke-box.

The feed pipe, which is not shown in the drawings, is arranged in a rather curious manner; the check is at the tube level, forward. The feed pipe crosses the boiler above the tubes, turns, and goes back to the combustion chamber, again crosses the boiler, runs forward and discharges near the point where it enters. The feed water in this way is well heated before it is allowed to come in contact with tubes or plates. While these boilers do not work under precisely the same conditions as those of the locomotive, the high pressure carried and the large diameters of the shells which have been built may be said to equalize the service to some extent. The fact that they run with salt as well as fresh water, occasionally the same boiler working part of the time with each, and have been successful for a long series of years, makes them all the

BOILER CONSTRUCTION—CROWN-SHEET STAYS.

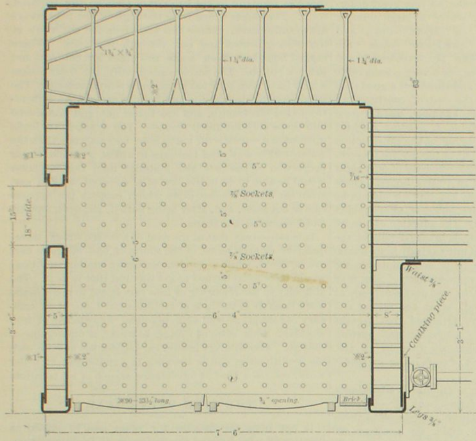


Fig. 1.—Longitudinal Section of Fire Box.

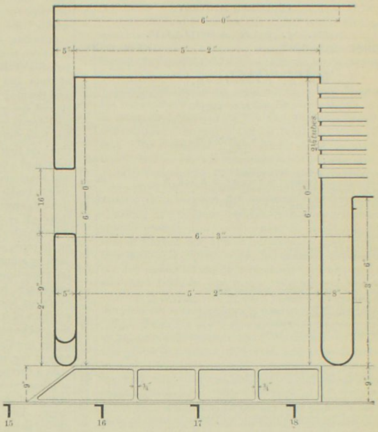


Fig. 5.—Longitudinal Section of Fire Box.

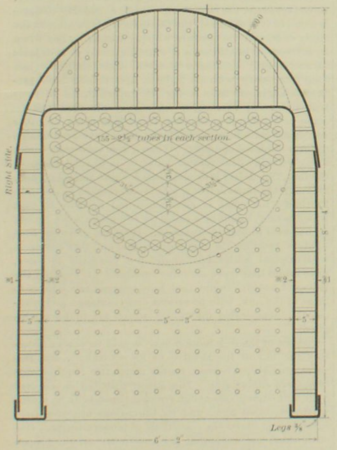


Fig. 2.—Cross Section of Fire Box.

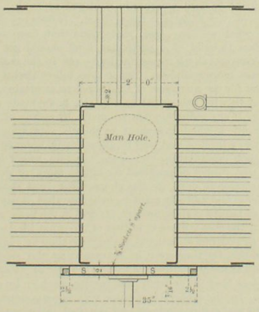


Fig. 3.—Longitudinal Section of Combustion Chamber.

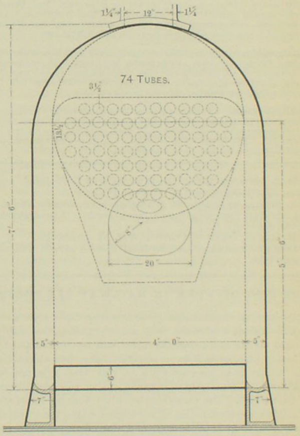


Fig. 6.—Cross Section of Fire Box.

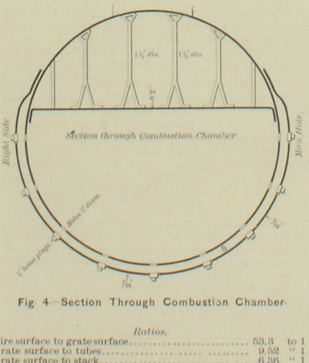


Fig. 4.—Section Through Combustion Chamber.

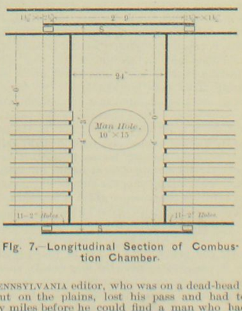


Fig. 7.—Longitudinal Section of Combustion Chamber.

more interesting. Some master mechanics will regard this construction with unusual interest, since it confirms in many ways the soundness of their practice, not only in staying crown-sheets but also in other details.

The following particulars give an idea of the proportions and power of one of these boilers intended to carry 150 pounds to the square inch. Its details are those shown in Figs. 5, 6 and 7.

Thickness of Iron.

Shell	7-16	inch.
Tube sheets	½	"
Outside of furnace, front and side	[illegible]	"
Inside of furnace, top and sides	5-16	"
Waist	⅜	"
Legs	⅜	"
Combustion chamber, outside	7-16	"
Drum	5-16	"
Drum heads	7-16	"

Surfaces.

Fire surface in furnace	117.0	sq. feet.
" " " tubes	910.2	" "
" " " combustion chamber	32.4	" "
" " " smoke box	7.8	" "
Total	1067.4	" "

Calorimeter, etc.

Area of grate	20.00	sq. feet.
" " tubes	2.01	" "
" " stack	3.14	" "
Steam room in shell	50.27	cubic feet.
" " " drum	80.91	" "
Total	131.18	" "

Ratios.

Fire surface to grate surface	53.8	to 1
Grate surface to tubes	9.52	" 1
Grate surface to stack	6.36	" 1
Stack area to tubes	1.496	" 1
Steam room to capacity of cylinders	11.8	" 1
Heating surface to capacity of cylinders	96.5	" 1

A PENNSYLVANIA editor, who was on a dead-head excursion out on the plains, lost his pass and had to walk seventy miles before he could find a man who had sufficient confidence in him to lend him money to telegraph home for his wife to sell the cook-stove and remit the proceeds at once.

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Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consinder of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

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THE COST OF WORK IN RAILWAY CAR SHOPS.

An intelligent contractor, who is not specially interested in railway car work, but who knows about how many freight cars of any particular class can be constructed by a certain number of men in a given time, has suggested the inquiry as to whether work of this kind can not be pushed more rapidly than it usually is in the general run of road shops. The answer to such an inquiry involves, of course, a consideration of the way in which the working force of a shop is organized, and the effectiveness of the tools and machinery employed. In a so-called "contract shop," or in any shop, in fact, which has to compete in the price of its products with the prices of competitors, the difference or margin between cost and selling prices, is a constant goad to the practice of economy in labor and time. In a railway shop, however, the case is somewhat different. Whatever competition there may be is not stimulated by open bids in the market. It is indirect, rather, especially when the road buys cars at long intervals. The home-made article is considered better than the product of the regular manufacturer, and although the cost may be greater, the difference is more than made up by better workmanship and a more serviceable car. So far as this is the case it must be admitted that home-made work is the most economical. This, however, is the point to be determined, but it is no easy matter to get at the actual facts. As the number of new cars built in many railway shops is not large, the necessity far rapid construction does not compel a careful investigation of means and methods, and the shop superintendent or car-builder is relieved to a very great extent of the pressure which is brought to bear on the contractor, and which drives him to the utmost.

It must be said, however, in behalf of the car-builder of a road shop that even when he is hard driven with work, he never has the opportunity to put in practice all the economies of a contract shop. He may receive an order from the Superintendent for 100 coal dump-cars, and, when these are finished the next order may be for 200 box-cars, and there may be 50 or 75 gondolas and a few refrigerator or line cars sprinkled in along to fill up gaps. The time allowed for completing the several kinds is often so long that there is no necessity, and in fact no use, in organizing the labor on the piece-work system in order to expedite things. The men, it may be said, will have to be kept in employ, and a day or two, more or less, on a car will make no very great difference. But in a contract shop, where a large number of cars must be built in a short time, and where the orders for a particular class are continuous, special machinery can be introduced, and it is even possible to put the men, or a very considerable number of them, on piece-work, and thus save a good deal of time and materially reduce the cost of construction. The Reading Coal & Iron Co., for example, has a succession of orders from the Philadelphia & Reading road for coal dump-cars. As soon as the details of the construction had been fully settled, men were put on piece-work for erection. At first the gang on this work consisted of only eight men, and a car-body was erected in twelve hours. There was some grumbling by the men lest they should not be able to make day wages. Practice, however, soon enabled them to erect a car in ten hours. The adoption of a more thorough system and better methods in the details of the work finally enabled six men to put up a car body in six hours; or, in other words, ten cars are built and painted in six days by a gang of six men. The same number of men is at the same time engaged on the trucks, and get them ready as fast as the bodies are completed, or at the rate of ten every six hours. The work is so arranged that certain portions of it, such as lifting the car bodies and putting the trucks under them, for example, are done by all the gangs working together, the work of each being in readiness at the same time.

As a further illustration of the economical advantages of piece-work the use of a drop forged hook for coal cars, instead of the old bent hook, has been introduced in these shops. The new form is made under the hammer, six dies in three pairs being employed. The quantity of metal used is about the same as in the old hooks, and their cost is perhaps a trifle less. They are, however, much stronger, and stand a strain of 37,000 pounds, while the old ones break under 23,000. It is, of course, hardly worth while to make these dies unless there is a large and continuous demand for the hooks.

It is obvious that the piece-work system can be effectively used only where there is a large number of cars to be built of the same standard of construction ; but wherever it can be used, whether in contract or road shops, it cheapens very materially the product. It does not follow, from what we have said, that roads that have only a few cars to build of a particular kind should get them from contract shops whose facilities are, in the nature of the case, more complete. But it does follow that it is important for the managers of road shops to ascertain as near as may be what the actual cost of the home-made car is, and see if any reduction can be made by means of more systematic methods in respect to details. At all events, fix upon a limit of cost that is allowable in order to keep up a shop organization and supply certain needs of the road that cannot be provided for unless more or less new construction is done in the shops. The road shop car-builder is undoubtedly right in believing that it pays the road to build a certain number of cars in the home shops, even if the cost is more than that of the same kind of cars built by contract shops; but at the same time he ought not to feel that the time spent in investigating the subject is as good as wasted unless the results are new and startling, or unless they differ from the results reached by guess-work. In discussing the question with the superintendent, he will find definite figures and detailed statements very serviceable, and without which the contract shop argument may carry the day to the detriment of both home, shop and road.

THE REPAIRING OF IRON CARS.

Whenever the utility of iron cars is suggested the first objection raised is the difficulty and cost of making repairs. The builder of wooden cars, in thinking of the problem of iron construction, is very apt to review his experience in the car shop and call to mind the labor expended and time lost in straightening iron sheets and bars with wood-working appliances. This experience is, of course, not at all favorable to the proposed innovation. But when the matter is viewed from the standpoint of iron construction alone, it appears in a somewhat different light.

We had occasion not long since to inspect a wreck of a dozen iron coal cars that went down an embankment, and shortly afterwards we also had an opportunity of seeing just how they were repaired. We found to our surprise that a large portion of the wrecked material could still be used, and that the difficulty of repairing was much less than is generally supposed. The cars referred to were of the hopper coal-car pattern of the Baltimore & Ohio road, illustrations of which we give in this number of the CAR-BUILDER. When one of these cars is brought into the repair shop, looking as if it had been exposed to a heavy cannonade at short range, it must not be supposed that a gang of carpenters are set to work upon it with axes, hand-saws and chisels. In the case of this particular style of car, and especially if the wreck is a bad one, the sills and running-board, which constitute all the wood-work, can probably be utilized to the best advantage as kindling-wood. In dealing with a wreck of this description the principal tools needed are cold chisels and sledges. Sheets that are not too badly bent can sometimes be hammered into shape, but generally the large sheets forming the cylinders of the hoppers are cut out and run through the rolls cold. In this way they can be got straight or bent to the required form. The sheets which form the cones of the hoppers are apt to suffer most. Those that are whole are cut away at the seams, heated and run through the rolls. Where ragged holes have been made, the edges are cut out and patches put on. The patches are usually got from sheets which have been torn too much to be worth mending. The strengthening rings at top and bottom present no difficulties to the blacksmith, and are taken out and hammered into shape without much trouble. The blacksmith looks upon such a wreck with much more complacency than the wood-worker does, and manages to utilize a much larger proportion of the wrecked material than the carpenter would be able to do in the case of a wrecked wooden car. Even the heavy bracket-irons which support the hoppers can be cut loose, and, after being heated, put upon formers and hammered into shape.

It is safe to say that in the case of a severe wreck, three-quarters, or even more, of the sheets of one of these cars can be saved, while a wooden can under similar conditions would have to be burned to get the iron that is in it. The difficulty in the repairing of iron cars is not so much in the work itself as in the lack of facilities for doing it in ordinary car shops, as well as a practical knowledge of iron working. This state of things, however, is undergoing a change. Almost every master car-builder has now his own blacksmith shop, and is learning the rudiments of boiler work, etc., as a kind of left-handed branch of his vocation.

THE LINK VALVE GEAR.

It has been the fashion for years past to regard as heretics all who doubted the perfection of the link motion, or who even believed it capable of improvement. It was the fashion to say that this one part of the locomotive was perfect, even though nothing else about it could be so considered. Engineers have been captivated with its beauty, its convenience, the ease with which a general comprehension of it is obtained, the fascination which attends the study of it, and the pleasure which the designer has when he succeeds in producing a new arrangement of it capable of successfully working a D-valve. This fascination and long familiarity with its failures and defects have prevented engineers from seeing its imperfections in their true light. So thoroughly have they accepted it as the acme of all that is good, that their judgments of other valve gear have been warped, and they have been unable to form unbiased opinions. When a new valve gear comes along with any discoverable defect in it characteristic of the link, this defect is at once seized upon and magnified, although the same defect would be overlooked in the link Partiality for what is established and hostility to that which is new, might be a cause for complaint were we not accustomed to human weakness. It seems, however, that light is breaking in many directions, and that engineers with original minds, having difficult problems to solve, have found that there are other methods of working the valves of a steam engine that have superior advantages to those of the link, with no serious disadvantages, and without the insuperable difficulties which are found in this gear.

The use of the link motion may be said to render necessary the use of the D-valve or its equivalent, but this valve, though convenient, hardly meets the requirements of modern engineering. The steam distribution effected by it, although good enough for past times, is by no means what is required now, and its limitations are peculiarly exasperating under the conditions of modern traffic. One of its worst features is that it is constantly grinding upon its seat. Only a small portion of its working time is it opening and closing the ports, and frequently there is a maximum pressure upon it while doing useless work and wearing itself out. At the shorter points of cut-off it makes a card whose only advantage seems to be that it is not as wasteful of steam as might be expected. It is hardly necessary to mention the large area, the unbalanced pressure and the consequent power required to move the large D-valve of a locomotive. This part of the subject has been too frequently discussed to need recapitulation; but it is necessary in considering the defects of the link, to refer to it and the useless wear of the link and link-block while working, which seems to be inseparable from its use. A well designed steam-engine, whether locomotive, stationary or marine, should have four valves, if steam is to be distributed in a perfectly satisfactory and economical manner. The best practice of the day indicates that these valves should be flat plates of cast iron, that they should work on gridiron openings, and if the steam distribution is just what theory and practice demand, they need not be balanced, since under all conditions of ordinary work they will be in equilibrium at the moment when they open and close; and as they are not in motion at any other time, the wear upon valve and seat will be merely nominal. The power to open and close will be only what is necessary to overcome the friction of the stuffing-boxes and the inertia of the parts.

Tracing the motion of such valves during a complete revolution of the engine, it will be found that the steam valve opens in equilibrium, compression having reached

the boiler pressure. At the moment of the cut-off, pressure above and below the valve will be equal, since, owing to the large size of the port, the initial pressure will not have fallen off perceptibly, even when the piston is moving at its highest speed. Consequently, the steam valve can be closed as it is opened, in equilibrium, at the end of the stroke. Expansion having reduced the pressure nearly or quite to that of the atmosphere, the exhaust valve can be opened with little or no pressure upon it. When cutting off at very short points in the stroke, the atmospheric line will generally be reached by the expansion curve, though when following full stroke the exhaust valve would have to be opened with considerable pressure upon it. This, however, would be the exception rather than the rule, and when the moment comes for the closure of the exhaust valve, the pressure in the cylinder ought to be only a few pounds above the atmosphere, which is too insignificant to effect its wear. It will be necessary to close the valve just soon enough to enable the compression to reach boiler pressure, at the beginning of the return stroke, when, of course, the steam valve will open as before, in equilibrium.

Long-stroke engines, running at rates of piston speed not very different from those of the locomotive, and carrying pressures of from 120 to 135 pounds per square inch, fitted with valves of this description, opening and closing without pressure, and lying perfectly still except at the moment of opening and closing ports, have run for years without requiring valve or valve seats to be touched for repairs. Valves of this kind have no more work to do when pressure comes upon them than an ordinary poppet valve. They have no opportunity of wearing their seats, because they do not move when there is any pressure on them. A locomotive fitted with valves of this kind would certainly need no steam-chest repairs, unless on account of sand or muddy water. The cylinders, because of a better steam distribution, would be smaller than they now are, and the engine would have one of those essential requisites too often lacking in the link motion—it would be smart. How the valves of an engine are to be moved in this way is not an easy question to answer. Many of our leading engineers have definite ideas on this subject, but are reluctant to give them expression. That the locomotive of the future will have its valves driven by an eccentric is highly improbable. A change to the Joy motion or some modification of it is probable, and it is possible that even a more complicated device than this may be adopted, in which case the defects attaching to greater complexity will be overcome by more perfect workmanship.

ELECTRIC PROPULSION OF RAILWAY CARS.

On another page will be found a comparative estimate by Thomas Whiteside Rae, C. E., of the cost of running trains on the elevated railways of New York City by steam and electric motors, showing a very great hypothetical saving in current expenses in favor of electric propulsion. Although his estimates have reference exclusively to the system of elevated roads in this city, the important saving in operating expenses as indicated by the figures is worthy of attention, in view of the possible application of electric motors to surface roads of various kinds.

It is well known that upon city and suburban lines steam motors have not yet been able to successfully compete with horses in the economy of operation. The great difficulty appears to be in adapting the weight and capacity of the locomotives to the conditions of track and traffic, so as to avoid an excessive outlay for repairs. The first cost of these engines, whatever their size and weight, is an important factor. Their weight must be such as to secure the necessary adhesion at all times. In wet weather, when the adhesion is less, and the wheels more liable to slip than when the tracks are dry, there is generally an increase in traffic; and if the engines are heavy enough to prevent slipping under these conditions their weight is ruinous to the light track, and if the track is heavy enough to sustain the weight, the weight of rail is out of all proportion to what is required when the track is dry and the traffic lighter.

The fact, as alleged by Mr. Rae, that 75 per cent. of the steam power at the generating stations can be returned by the dynamo motors at any reasonable distance, is something which suggests the possibility of an entire revision of the ordinary methods of transmitting power. These methods, as is well known, become ruinously wasteful as the distances increase. In shops and shop-yards it is considered cheaper to run steam pipes, and use special engines to drive large machine tools, than to use lines of shafting; yet the small engine can not do its work with less than twice the weight of steam needed for the same amount of power when developed in the large engine of the shops. A train moved by electric propulsion, or self-propelled, so to speak, requires less power than if drawn by a locomotive. This principle is illustrated in the use of "pushing" engines on mountain roads, where it is found by observing the slack of the coupling links that the rear engine can push more cars than the front one can pull, both engines being of the same capacity; or, in other words, one engine that can only pull ten cars of a given weight up a grade, can still push two additional ones in front.

From evidence that has been furnished us by three well-known electricians it is certain that considerably more than 75 per cent. of power can be returned by the dynamos with a fairly good plant. It is also quite certain that from the progress that is being made in electrical science the dynamo will in a year or two be a much more perfect machine than it is now. The experiments of Professor Morton, of the Stevens Institute of Technology, in respect to the power needed to drive the dynamo, and the power it will give off when used as a motor, are likely to throw new light on the subject.

HAZARDS OF RAILROAD TRAVEL.

Any one who takes the trouble to estimate the average daily or yearly aggregate of deaths from casualties of all sorts will be struck with the truthfulness of the saying that human life is cheap. And when to this aggregate is added the victims of disease that are swept away in great battalions day after day, it will appear the more appallingly evident that the destructive forces of nature, in conjunction with the agency of man, are fearfully lavish of human life. This appalling mortality, however, is such an every-day thing, so inevitable and so much a matter of course, that the great current of existence sweeps on with scarcely a ripple, provided there is nothing unusual or aside from the common experience in the methods by which life is extinguished. If we take the vast mortality caused by war, fires, explosions, and the traps and pitfalls innumerable, which waylay us, and which are in a certain sense preventable, how ludicrously small in comparison is the number of lives destroyed by railroad accidents, or, for that matter, the number of persons injured, but not fatally, by such accidents. And the comparison is still more significant in view of the fact that during the year 1882 the number of passengers transported on all the railroads of the United States was a little more than 289,000,000 (leaving out 86,000,000 that were carried on the elevated roads of New York city), a number very nearly six times the total population of the whole country. It must also be borne in mind that liability to injury from accident is not confined to passengers alone, but is shared more or less by the great army of train hands, track men and others, thus making the numerical basis upon which to estimate individual chances of getting hurt still larger.

The monthly record of train accidents, published in the *Railroad Gazette*, shows a yearly average for the four years ending (and including) January, 1884, of 407 persons killed and 1,615 injured. These figures comprise only the casualties reported, and for obvious reasons the number is not likely to be exaggerated. On the contrary it is safe to say that it is very much below the mark, inasmuch as there are a great many accidents of minor importance, especially in the movement of freight trains, that escape public notice even when they are attended with loss of life or serious injuries to persons. Even if the above figures were increased by one half we do not think it would be an exaggeration of the actual facts. Upon this basis it would appear that there is killed each year only one passenger to 473,000 carried, and only one injured to 119,000 carried. Mr. Charles Francis Adams, in speaking of the total mortality from warfare, intemperance, bad sewerage, worse ventilation, etc., suggests that if the blood of the martyrs in these cases is the seed of the church, the seed is terribly slow of germination, so far as the abatement of these evils is concerned. But it is quite otherwise with the victims of railroad disasters. Every one that occurs is investigated, and the new precautions and more watchful care that follow tend to increase the safety of railroad travel to an extent more or less appreciable, until it is not overstating the case to say that, considering the ordinary vicissitudes of life, there is no safer place for a man to put himself than the inside of a first-class car in a fast-running train on a well-managed road.

NEW WOODS FOR CAR BUILDING.

We print on another page a description of some of the valuable wood products of Cuba, compiled from an elaborate article by Esteban D. Estrada, M. E., in the November and December numbers of Van Nostrand's Magazine, and including a series of tests made under the supervision of Professor Thurston at the Stevens Institute of Technology.

With the exception of mahogany, rosewood, satin wood, cocoabolo, and a few other varieties that are used in cabinet work in this country, our knowledge of tropical woods is very limited both as regards the distinctive qualities of many kinds and their peculiar fitness for constructive purposes. Mahogany is practically the only tropical wood that is used to any extent in the United States for other than strictly ornamental purposes. Lignum vitæ, it is true, is used for sheaves of blocks and in other ways in which a hard, tough and durable wood is required to resist wear. Mr. Estrada's knowledge of the timber trees of Cuba probably enabled him to select for testing those only that could be imported to this country at prices that would admit of their being used with advantage and profit in our wood consuming industries. The tests included a large variety of woods, many of which were more suitable for furniture and inside finish than for construction where strength and durability are the chief essentials. There were some, however, that exhibited these qualities to such a degree as to render the timber useful for car sills, especially as the trees are of a sufficiently large size. It is also probable that some of the varieties of smaller growth might be used for posts instead of ash or pine, since they have much greater strength and only a little more weight.

The stiffest and largest of the timbers described is the *Iqui Comun*, which has a specific gravity of 1.20. The tree grows to a height of from 50 to 70 feet, and the timber can be obtained with a maximum section of 18 inches square. It is very hard, fine-grained and compact, has a rose-wood color, and becomes harder and darker with age, while its strength is greater than that of any American woods used in the arts, and its resistance to compression is even greater than lignum vitæ.

Another of the Cuban trees which seems deserving of the car-builder's attention is the *Dagame*, which is found in great abundance in the forests. It grows straight, has but few branches, and attains a height of from 40 to 50 feet. The wood has a pale yellow color, is moderately heavy, and its texture resembles boxwood, can be worked either across or with the grain and takes a good polish. The largest sized lengths that can be obtained are 12 inches square. It is very strong and rivals the *Iqui Comun* in elasticity and stiffness, besides being much lighter. Its specific gravity is only .90, which is about the same as that of English oak and but little more than that of our own white oak, which is .86. So far as can be judged from the description, it might be used with advantage for end-sills and posts in car work. We are not told how it behaves in drying. In Spain it is used for many of the purposes for which hickory is used in the United States.

The *Baria* is a wood of a greenish-brown color, weighs 48 lbs. per cubic foot and has a specific gravity of .78. The tree grows to a height of 60 feet, and has a diameter of 18 inches. This timber is used in framing and carriage making, and might very probably be used to advantage in car construction.

The *Sabicu* is described as one of the largest of the timber trees of Cuba. Although it attains colossal dimensions it is somewhat crooked, but yields an excellent timber 30 and 40 feet in length, and from 30 to 40 inches square. It is hard, heavy, strong and durable, works well either across or lengthwise the grain, and is used in Cuba, Spain and England for keelsons, engine bearers, ties, piles, posts beams, etc. Its strength, or stiffness rather, is quite equal to that of any of the woods above mentioned, and although these are not the strongest nor in every case the stiffest of the Cuban woods, their characteristics are such as to invite further investigation.

Experiments were made with fifteen varieties of wood, by subjecting the specimens to transverse, torsional and compressive strains. The results are quite remarkable, and the only question seems to be whether these woods can be delivered at our ports at prices that will warrant their importation. Dealers in mahogany and other fancy woods can doubtless throw some light on the subject. At all events, it would seem to be worth the trouble to find out what would be the cost of obtaining sample lots for trial. It should be noted that while the tests show that the weight of these Cuban woods considerably exceeds that of our native timber used in car construction, their average native strength is much greater, so that the alternative is presented of using the same weight and obtaining more strength, or retaining the same strength by reducing the weight. The quality of some of the specimens is such as to make it probable that they might be used to good advantage for the draw-timbers of freight cars.

Our Directory of Railroads.

In order to keep our Directory of Railroads, with its multiplicity of details, as near correct as possible, we have sent a circular to every road, with a slip containing the names of officers, places of address, etc., as published in our last issue, with a request to make any needed corrections. Our list, as it appears in the present issue, has been revised so far as replies to these circulars have been received. A number of roads, however, yet remain to be heard from.

The value of this Directory depends very much upon its correctness, and although it is not possible to make it perfectly accurate at any time, in consequence of the numerous changes of officers, titles, places of address, and the details of road organization, still, it can be made very nearly so—more so, in fact, than any other similar list published—if our readers will only give us prompt notice of any changes, errors or omissions that may come to their knowledge.

Railway Association Conventions.

June 11.—Yardmasters' Mutual Benefit Association at Atlanta, Ga. Secretary, Joseph Sanger, Indianapolis.

June 10.—Master Car-Builders' Association. Annual Convention. At Saratoga Springs, N. Y. Secretary, M. N. Forney, 71 Broadway, New York.

June 18.—American Railway Master-Mechanics' Association. At Long Branch, N. J. Secretary, J. H. Setchel, Cincinnati.

September 3.—Master Car-Painters' Association. At Boston. Secretary, R. McKeon, Kent, Ohio.

October 15.—American Street Railway Association. At New York. Secretary, J. W. Richardson, Brooklyn.

October 22.—Association of American Railroad Superintendents. Semi-Annual Convention. At Washington, D. C. Secretary, Waterman Stone, Providence, R. I.

January, 1885.—National Association of General Baggage Agents. At Boston. Secretary, W. B. Starring, Chicago.

The Western Railway Club.

A meeting for the organization of this club was held in Chicago March 20. There were present the following master car-builders: Messrs. Townsend, of the Chicago & Alton; Cook, of the Chicago & Eastern; Snow, of the Illinois Central; Verbryck, of the Chicago, Rock Island & Pacific; Bryan, of the Chicago & Iowa; McDevitt, of the Chicago West Division Street Railway; and Mr. Forsyth, mechanical engineer of the Chicago, Burlington & Quincy. Mr. Townsend acted as temporary chairman and Mr. Forsyth as secretary. The following constitution was adopted, which we give in full, as explaining the objects and methods of the club:

CONSTITUTION OF THE WESTERN RAILWAY CLUB.

ARTICLE I.

The name of this association shall be "The Western Railway Club."

ARTICLE II.

The object of the association shall be the advancement of knowledge concerning the construction, repair and service of railroad rolling stock by discussion in common; investigations and reports of the experience of its members; to provide an organization through which the members may help to bring about uniformity and interchangeability in the parts of railroad cars; to improve their construction, and to adjust the mutual interests growing out of their interchange and repair.

ARTICLE III.

Any one having the supervision of the construction of railroad machinery, or of its inspection at terminal points, may become a member of this association by paying their dues for one year, and by signing their name to this constitution.

ARTICLE IV.

All members will be subject to the payment of annual dues of $5 to defray necessary expenses, and each one signing these articles will be considered a member until written resignation is received by the secretary.

ARTICLE V.

The officers of the association shall be a president, vice-president, a secretary and a treasurer, who shall serve a term of one year from the date of election and shall perform the usual duties pertaining to such offices.

ARTICLE VI.

At each meeting the president shall appoint a committee of three, whose duty it shall be to report at the next meeting subjects for discussion and investigation, also a committee to investigate and report on the subjects presented by the previous committee. These subjects shall be taken up at the proper time, and shall form the principal business of the meetings.

ARTICLE VII.

Meetings shall be held on the third Wednesday of each month, at 2:30 P. M., excepting during the months of June, July, and August, when no regular meetings shall be held.

ARTICLE VIII.

At any regular meeting five members shall constitute a quorum.

ARTICLE IX.

No patentees or their agents, nor the agents for the sale of railroad supplies, shall occupy the attention of the meetings unless they are specially invited to do so by the committee on subjects, and the article which they represent forms a part of the subject for discussion for that particular meeting.

ARTICLE X.

The order of business and the rules governing members shall be the same as those of the Master Car-Builders' Association.

ARTICLE XI.

Amendments to the constitution and by-laws may be made by a two-thirds vote of all members, but one month's notice must be given of any proposed amendment.

THE HUYETT & SMITH MANUFACTURING CO., of Detroit Mich., have issued the following circular:

"This will advise you that Miles C. Huyett, late President o the Huyett & Smith Manufacturing Co., has resigned his positio. and sold his entire interest in this company to Messrs. D. M Ferry, who was elected President (also President D. M. Ferry Seed Co.): William A. Moore, who was elected Vice-President; William R. Harmont, who was elected Secretary and Treasurer, W. D. Smith, Superintendent.

"These gentlemen having purchased Mr. Huyett's interest have also increased the capital of the company, and by improved facilities are preparing to meet the increased demand for the most successful Exhaust Fans, Forge and Pressure Blowers ever made.

"Mr. W. D. Smith, the inventor and patentee of these celebrated machines, continues his interest in the company, and remains Superintendent of the Mechanical and Manufacturing Department. All rights in his inventions and patents have been assigned by Mr. Smith to this company, and remain its sole and exclusive property.

"Believing the machines embody the only essential and radical improvements that have been developed in their line for many years, we solicit the patronage of the trade, under the strongest guarantee of superiority of construction and a saving of 50 per cent. in power.

"With thanks for past favors, and suggesting only that in our reorganization the trade will see evidence of stability and good faith. Soliciting your orders and inquiries, we remain,

"Yours truly, HUYETT & SMITH MFG. CO.

"Send for catalogue and prices."

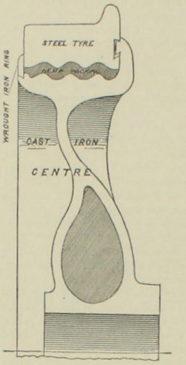
MR. J. H. BASS, having disposed of his interest in the St. Louis Car Wheel Co. about two years ago, the name of the concern was changed to the Dutro Car Wheel Co., and has since been under the sole management of the Messrs. Dutro. Recently, however, Mr. Bass has renewed his connection with the concern as its President. Mr. J. I. White, Secretary of the Bass Foundry & Machine Works, occupies the same position in the St. Louis establishment, which will again be known as the St. Louis Car Wheel Co. He, in connection with Mr. T. C. Dutro, Vice-President, will have charge of the business of the company, Mr. J. M. Dutro filling the position of Treasurer. Mr. Ezra H. Sinley, so long and favorably known in connection with the railway supply business in St. Louis, appears in the new directory. The capital of the company having been augmented and its facilities increased, we predict for it increased prosperity under the new organization.

COTTON SEED HULLS, it is claimed, make the best and most economical packing for car journal boxes, for the reason that in order to determine the comparative cost of hulls and waste the boxes on one side of a car have been packed with waste and those on the opposite side of the same car with hulls, and the account of cost for the same length of time showed a saving of 36 per cent. in favor of the hulls. The two kinds of packing were also tried in like manner with a locomotive, with a saving of 58 per cent. in favor of the hulls, this saving being in the greater cheapness of the hulls and also in the smaller quantity of oil used, the hulls requiring much less oil than the waste does. And, furthermore, it is said that a leading trunk line has used within the last few months over 100,000 pounds of hulls for packing. Orders for same, and applications for circulars, may be sent to the National Railway Patent Waste Co., 239 Broadway, New York.

The Atwood Hemp-Packed Steel-Tired Wheel.

An interesting test of this wheel was recently made at Allentown, Pa., in the presence of a number of railway gentlemen and other experts. The construction of the wheel is peculiar, as will be seen by the section shown in the cut, the tire being held to the center by means of corrugations in both, which are packed with hemp in such a way as to secure the parts without the use of bolts or rivets.

The object of the test was to determine the amount of power necessary to cause the tire to move circumferentially on the center. The results obtained show an extraordinary resistance on the part of the hemp, and far exceeding what would be necessary to overcome the shocks received in railway service, as may be seen from the following facts extracted from the report made by Prof. Wm. D. Marks, of the University of Pennsylvania, under whose supervision the test was made:



The first experiment was made on a wheel 42 inches o. d. The wheel was bolted through its cast-iron center to a very heavy casting, and the steel tire was drilled and tapped for 1¼ inch bolts. Five of these bolts were used to fasten a wrought-iron lug at each side of the wheel. Against one lug was placed the ram of a hydraulic jack 4 inches in diameter (12.566 sq. inches area) at a radial distance of 26¼ inches. Against the other lug was placed the ram of a 3½-inche jack (area, 9.601 sq. inches) at a radial distance of 28 inches. The pressure on both jacks was then carried to 4,500 lbs. on the square inch. The pressure exerted was 49.87 railroad tons of 2,000 lbs., and the steel tire did not move upon its hemp packing.

The second experiment was made on a wheel 33 inches o. d. The wheel was treated in the same manner, the two rams having a radial distance of 24 inches each from the center of the wheel. The lugs were bolted as before. The pressure was carried to 3,500 lbs. on the square inch, when the 1¼ inch steel pins assisting to hold the cast iron center broke, and the experiment ceased. The steel tire did not move on its hemp packing, although subjected to a stress of 38.79 railroad tons at the center of the rams.

It is calculated that a pressure was reached at least four or five times as great as would be required to twist off an ordinary car axle under the same conditions; and in view of this fact it may be said that so far as movement of the tire upon its seat is concerned, when exposed to the strain of actual service, the wheel is perfectly safe.

A paper descriptive of the history and construction of the Atwood wheel, was read by Henry S. Drinker, Esq., at the meeting of the New England Railway Club, lately held in Boston, at which "The Wheel of the Future" was the subject discussed.

THE PENFIELD BLOCK COMPANY (Lockport, N. Y.) have issued a new illustrated catalogue and price list of 51 pages, containing a large amount of information of special value to purchasers of the company's line of "Anchor" Brand Pulley Blocks, and an extensive line of specialties, including lock-faucets, mallets, baggage-barrows, store and warehouse trucks, etc. Among the new features of this catalogue are lists of phosphor-bronze self-lubricating bushed blocks; improved anchor snatch-block; English pattern wrought-iron snatch-blocks; special blocks and sheaves for ice trade; Moore's stationary hand-hoist; cant hooks; new styles of baggage barrows, etc. There is also a complete cipher telegraph key, by the use of which goods may be ordered by telegraph in a very expeditious manner, and with a great saving of time. Copies of the catalogue will be supplied on application to the company, as above, or to H. B. Newhall, 105 Chambers street, New York.

Drake's Travelers' Magazine.—The March number of this excellent railway publication is as bright and attractive as a new coin from the mint. Yet it is by no means an exceptional number either in neat typography, sparkling and varied editorial and selected matter, or the completeness and admirable arrangement of its descriptive routes and time tables, to say nothing of other features of special interest to the traveling and business community. John H. Drake, publisher, 198 Chambers Street, New York. Price, $1 a year.

THE Virginia Iron Works (Thos. W. Godwin & Co.), of Norfolk, Va., are represented in New York by Mr. A. L. Rowe. Office room 45, Boreel Building, 115 Broadway, New York.

THE new Wilmington & Northern Railroad shops, at Wilmington, Del., are now in full operation, the removal from the old shops at Reading having been completed. The building covers an acre of ground, and includes, under a single roof, machine shop, carpenter shop, and blacksmith shop. The machine shop contains, among other regular machinery, four large lathes and a special lathe for turning up drivers. A regular force of thirty hands is employed.

The Cummer Engine Co., of Cleveland, O., has issued a new illustrated catalogue of 150 pages, which contains a large amount of valuable information in regard to the construction and economical management of steam engines. The illustrations are well executed, and exhibit in section and perspective detail, all the essential parts of the machine. As an example, we may mention the illustration of their solid end connecting rod, showing the simplicity and suggestiveness of the construction. This solid end, with its key or wedge, set-screws and brasses, consists of five pieces only, arranged in such a way as to go upon a pin with a collar, and when once in place cannot slip out unless there is a breakage in some of the parts. The set-screws might be lost, even, without disabling the rod. Between 30 and 40 pages of the book, which is a small treatise, in fact, on steam engines, are devoted to a statement of the principles involved in the economy of engines. Tables are given for each of the several styles buil by the company, showing diameters, stroke and horse-power at different points of cut-off. The remarks in regard to boilers, from the pen of Mr. Wm. M. Barr, are worthy of attention, and what is said with respect to the value of heating surface is of special interest to railway master mechanics.

Our Directory.

We note the following changes since our last issue. A large number of minor corrections have also been made from replies received to circulars sent out, which we do not think it necessary to recapitulate here:

Alabama Great Southern.—D. McLaren is now Superintendent of this road, vice C. B. Wallace, resigned.

Baltimore & Ohio.—John W. Clark has been appointed Acting Master Car-Builder in place of L. Packard, resigned.

Chicago, St. Louis & Southwestern.—This company is the successor of the Chicago, Pekin & Southwestern.

Chicago & Atlantic.—The office of Purchasing Agent has been abolished, and the duties of the position are now being performed by J. C. Williams, the General Superintendent.

Cincinnati, Van Wert & Michigan.—D. R. Ennis has been appointed General Superintendent.

Danville Olney & Ohio River.—C. E. Henderson has been appointed Receiver in place of Charles Howard, resigned.

Denver & Rio Grande.—Col. R. E. Ricker (late Superintendent of the Central of New Jersey) has been appointed General Superintendent, vice R. B. Cable, resigned.

Eureka & Palisade.—B. Gilman has been appointed General Superintendent in place of P. Everts.

Gulf, Colorado & Santa Fe.—W. H. Martin having resigned the position of Master Car-Builder, the office will be discontinued. Geo. B. Nichols, Master Mechanic, assumes control of the Motive Power and Car Department.

Kentucky Central.—J. L. Hackathorn has resigned the position of Master Car-Builder.

Louisville, New Albany & Chicago.—H. O. Nourse has been appointed Auditor and Purchasing Agent in place of G. C. Breed, resigned.

Missouri Pacific.—G. A. Haggerty has been appointed Master Mechanic of the New Orleans Division in place of P. Stevens, resigned.

Northern Pacific.—G. S. La Rue having resigned the position of Master Mechanic of the Rocky Mountain Division, James Walsh has been appointed as his successor, with office at Missoula, Montana.

Ogdensburg & Lake Champlain.—Abraham Klohs has resigned the position of Superintendent and Master Mechanic of this road, to take effect June 1. His resignation is on account of advanced age.

Sinaloa & Durango.—George S. Skilton has been appointed Chief Engineer and General Superintendent of this road in place of H. M. Fickinger, resigned.

Texas Western.—Henry Hatch has been appointed General Superintendent, with office in Houston, Texas.

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One Car Wheel Boring Machine, for 42-in. wheels, made by Wm. B. Bement & Son, perfect condition.
One Car Wheel Boring Machine, for 42-in. wheels, made by Wm. B. Bement & Son, good condition.
One Car Wheel Boring Machine, for 42-in., with hub facing attachment, N. Y. Steam Engine Co., good condition.
One Double Axle Lathe; made by Niles Tool Works, excellent order.
Two Axle Lathes, made by Fitchburg Machine Co., very good order.
One Hydraulic Car Wheel Press, good order.
Two Lewis, Oliver & Phillips' Two-Spindle Bolt Cutters, very good order.
One Six-Spindle Drill, made by Wm. B. Bement & Son, very good order.
One Durrell Seven-Spindle Nut Tapping Machine, almost new.
One Durrell Seven Spindle Nut Tapping Machine, excellent order.
One Hydraulic 78-in. Driving Wheel Press, good condition.
One 25 in. by 12 ft. bed Engine Lathe, Bement's, excellent order.
Two Upright Drills, 42 in., Bement's, good condition.

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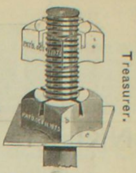

a. ATWOOD NUT on bolt without bearing on base slots open.
b. ATWOOD NUT turned to bearing c partially closing the slots and grasping the bolt.

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MAKERS OF STRICTLY FIRST-CLASS
Railway Varnishes,
AND MANUFACTURERS OF
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BALTIMORE & OHIO RAILROAD CO., N. S. Hill, Purchasing Agent, Baltimore Md.
CHICAGO & ALTON RAILROAD CO., A. V. Hartwell, Purchasing Agent, Chicago, Ill.
CHICAGO & NORTHWESTERN RAILROAD CO., R. W. Hamer, Purchasing Agent, Chicago, Ill.
LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.
NORTHERN RAILROAD OF CANADA, F. W. Cumberland, Superintendent, Toronto, Ont.
NAUGATUCK RAILROAD CO., G. W. Beach, Superintendent, Waterbury, Conn.
PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD CO., R. N. Dowd, Commissary, New Haven, Conn.
UNION PACIFIC RAILROAD CO., } A. D. Clark, Purchasing Agent, Omaha, Neb.
KANSAS " " " }
CHICAGO, BURLINGTON & QUINCY RAILROAD CO., Wm. Irving, Purchasing Agent Chicago, Ill.
LOUISVILLE, CINCINNATI & LEXINGTON RAILROAD CO., Wm. Mahl, Purchasing Agent, Louisville, Ky
GRAND TRUNK RAILWAY N. Wall, Port Huron, Mich.
LITTLE ROCK & FORT SMITH RAILROAD CO., T. Hartman, Purchasing Agent, Little Rock, Ark.
GILBERT & BUSH CO., Troy, N. Y.
WASON MANUFACTURING CO., Brightwood, Mass.
BILLMEYER & SMALL MANUFACTURING CO., York, Pa. } Railroad Car Builders.
JACKSON & SHARP CO., Wilminton, Del.
BARNEY & SMITH MANUFACTURING CO., Dayton, O.

The advantages derived from the use of such Special Colors are many, a few of which are found below: **ABSOLUTE UNIFORMITY OF SHADE. DURABILITY,** as we use perfectly pure materials. **SAVING OF MONEY,** because of small quantity required. **SAVING OF TIME,** in the putting on of the same. **SAVING OF LABOR AND MATERIAL,** as no extra amount of Varnish will be required to hide a sanded surface **LARGER DEGREE OF CERTAINTY** that there will be an absence of cracked work, as our mixtures are all uniform, being done by weight only.

We make any desired shade, it only being necessary that purchasers furnish us with sample of color desired, stating the time they would like to have the paint dry in.

We shall be glad to furnish samples and give prices to any who may wish to avail themselves of the above advantages.

Very respectfully

JOHN W. MASURY & SON, New York and Chicago.

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Shipman & Bolen, Manufacturers of fine
Railway Varnishes,
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AND MANUFACTURERS OF
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Portland Company, of Portland, Me. LOCOMOTIVES.
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MALLEABLE CASTINGS FOR RAILWAY AND CAR-BUILDERS A SPECIALTY.
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MAKE IRON CASTINGS
AIR FURNACE IRON
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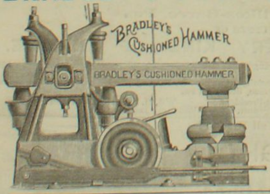

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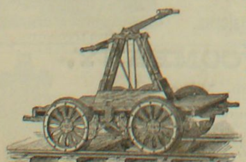

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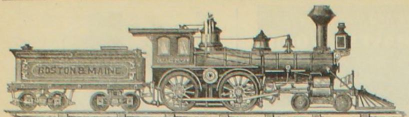

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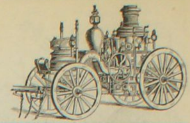

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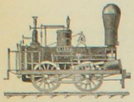

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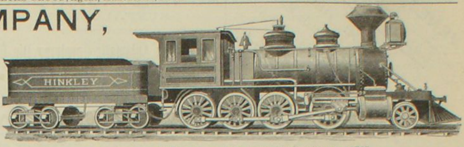

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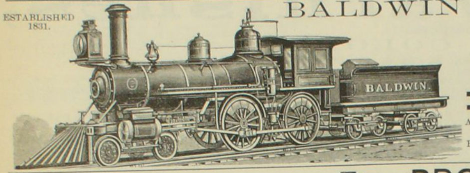

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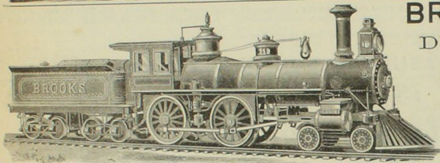

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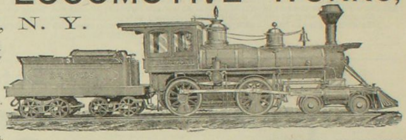

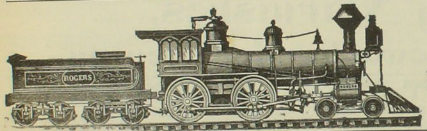

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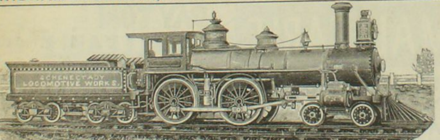

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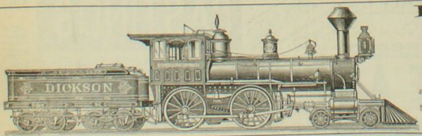

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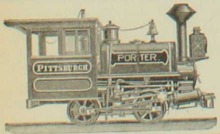

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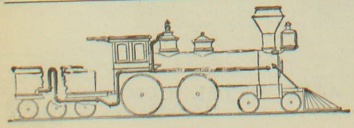

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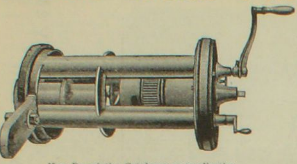

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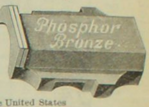

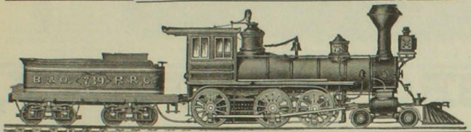

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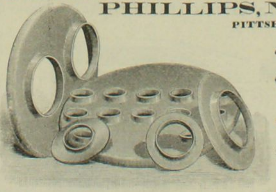

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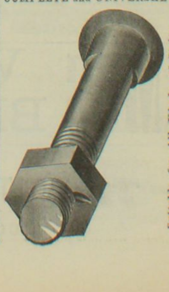

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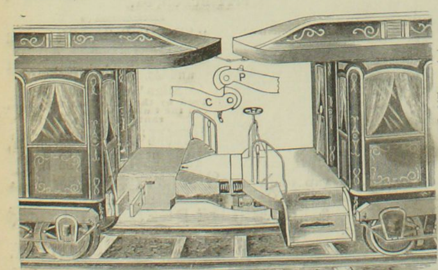

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Geo. F. Chalender, *A. Supt*.Albuquerque, N. M.
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B

Bachman Valley R. R. (*See Han. Junc., Han. & Gett.*)
Balt. & Delaware Bay R. R. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, *Gen. M. & P. A*. Chestertown, Md.
Baltimore & Hanover R. R. (*See H. J., H. & G.*)
Baltimore & Ohio R. R.
4-8½ g. 1,612 m. 571 lo. 15,897 cars.
S. Spencer, *2d V. P. & Gen. Man*. Baltimore, Md.
N. S. Hill, *Pur. Agt*..........Baltimore, Md.
Ohio Riv. Div. 4-8½ g. 972 m.
W. M. Clements, *Mast. Trans*...Baltimore, Md.
A. J. Cromwell, *Act. M. of M*....Baltimore, Md.
I. N. Kalbaugh, *M. M*..........Baltimore, Md.
Wm. Edwards, *M. M*...Martinsburg, W. Va.
Sam. Houston, *M. M*..........Piedmont, W. Va.
Robert Maxwell, *M. M*..........Cumberland, Md.
S. B. Crawford, *M. M*..........Grafton, W. Va.
Alex. Laird, *M. M*..........Parkersburg, W. Va.
Chas. Hirsch, *M. M*..........Wheeling, W. Va.
Pitts. Div.: T. M. King, *Gen. Supt*...Pittsburg, Pa.
J. E. Sampsell, *Ast. M. of M*. Connellsville, Pa.
Trans-Ohio Divs.: J. G. Foreacre, *G. Man*. Newark, O.
W. H. Harrison, *Asst. M. of Mach*..Newark, O.
E. L. Weisgerber, *M. M*..........Newark, O.
H. M. Ingler, *M. M*..........Bellaire, O.
O. B. Perkins, *M. M*..........Zanesville, O.
Andrew Beckert, *M. M*..........Sandusky, O.
F. J. Gunther, *M. M*....Chicago Junction, O.
Chi. Div.: *Gen. Supt*...Chicago, Ill.
Benj. Lowther, *M. M*..........Garrett, Ind.
W. H. Wilkinson, *M. M*..........Kingston, Ill.
Baltimore & Philadelphia. 4-8½ g. 20 m. 4 lo. 35 c.
D. Connell, *Supt*..........Wilmington, Del.
Baltimore & Potomac R. R. (*See Penna. R. R.*; (7) *Div.*)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, *Supt. & Pur. Agt*..Bangor, Me.
C. S. Nason, *M. M*..........Bangor, Me.
J. W. Comins, *M. C. B*..........Oldtown, Me.
Bangor & Portland Ry. 4-8½ g. 25 m. 3 lo. 3 c.
C. Miller, *Pres*..........Blairstown, N. J.
Barclay R. R. 4-8½ g. 16 m. 6 l. 200 c.
F. F. Lyon, *Supt*..........Barclay, Pa.
J. A. Hardenburg, *Pur. Agt*..21 Cort. st., N. Y.
Wm. Johnson, *M. M*..........Towanda, Pa.
Batesville & Brinkley R. R. 3 g. 25 m. 2 lo. 34 c.
Wm. Black, *Pres. & Gen. Supt*..Brinkley, Ark.
W. J. Thompson, *Gen. Man*..Little Rock, Ark.
R. B. Davis, *Pur. Agt*..........Brinkley, Ark.
Patrick John White, *M. M*..........Brinkley, Ark.
Baton Rouge, Grosse Tête & Opelousas R. R.
5-6 g. 29 m. 3 lo. 12 c.
D. C. Montan, *Gen. Supt*..........Port Allen, La.
Bedford & Bloomfield Ry. 3 g. 43 m. 5 lo. 65 cars.
Jas. W. Kennedy, *Gen. Supt. & Pur. Agt.*; and
Capt. Geo. Elliott, *M. M*..........Bedford, Ind.
Richard G. Elliott, *M. C. B*..........Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 42 m. 5 lo. 71 c.
S. L. Mooney, *Gen. Supt*..........Woodsville, O.
J. B. Hong, *M. M*..........Bellaire, O.
Bell's Gap R. R. 4-9 g. 23 m. 4 lo. 148 cars.
R. G. Ford, *Supt*..........Bellwood (P. O.), Pa.
Geo. Van Brunt, *M. M*..........Bellwood, Pa.
A. Zimmerman, *M. C. B*..........Bellwood, Pa.
Belt R. R. 4-8½ g. 12 m. 10 lo.
W. P. Ijams, *Supt*..........Indianapolis, Ind.
Bennington & Rutland Ry. 4-8½ g. 59 m. 10 lo. 236 c.
F. C. White, *Supt. & Pur. Agt*..Bennington, Vt.
G. W. Blanchard, *M. M*..........Rutland, Vt.
Berlin Branch R. R. (*See Han. Junc., Han. & Gett.*)
Bingham, Canyon & Camp Floyd (*See Den. & Rio Gr.*)
Bladen, Columbus & Florida. 4-8½ g. 16 m. 2 lo. 2 c.
John Colville, *Pres*..........Wilmington, N. C.
Bodie Lumber Co. 3 g. 34 miles.
Thomas Holt, *Supt. & Pur. Agt*.....Bodie, Cal.
E. M. Luckett, *M. M. & C. B*..........Bodie, Cal.

Boston, Barre & Gardner. 4-8½ g. 37 m. 8 lo. 108 c.
H. H. Marshall, *Supt. & P. A*..Worcester, Mass.
Frank I. Goodwin, *M. M*....Worcester, Mass.
Boston, Concord, Montreal & White Mts. R. R.
4-8½ g. 167 m. 40 lo. 1,116 cars.
W. A. Stowell, *Supt*..........Plymouth, N. H.
Geo. W. Storer, *Pur. Agt*..........Boston, Mass.
R. Adams, *M. M*..........Lake Village, N. H.
G. A. Ferguson, *Asst. M. M*..Lake Village, N. H.
L. D. Pickering, *M. C. B*....Lake Village, N. H.
Whitefield & Jefferson Div.:
A. L. Brown, *Supt*..........Whitefield, N. H.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 87 m. 18 lo. 1,038 cars.
H. L. Morrill, *Gen. Man*..........Saratoga, N. Y.
C. H. Cory, *Pur. Agt*.....Mechanicville, N. Y.
C. H. Cory, *Supt. & M. M*..Mechanicville, N. Y.
John S. Ellis, *M. C. B*......Mechanicville, N. Y.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 7 lo. 46 c.
C. A. Hammond, *Supt. & P. Agt*.Boston, Mass.
R. D. Sutherland, *M. M*..........Boston, Mass.
John Coghlan, *M. C. B*..........Boston, Mass.
Boston, Winthrop & Point Shirley R. R.
3 g. 10 m. 1 lo. 8 c.
C. A. Parks, *Supt*..........Boston, Mass.
J. W. Davis, *M. M*..........Winthrop, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, *Gen. Supt*..........Boston, Mass.
E. Gallup, *Asst. Supt*..........Springfield, Mass.
A. B. Underhill, *Supt. M. P*...Springfield, Mass.
F. D. Adams, *Gen. M. C. B*..........Allston, Mass.
H. B. Chesley, *Div. Supt*..........Boston, Mass.
G. H. Colby, *Div. M. M*..........Boston, Mass.
C. E. Grover, *Div. Supt*....Springfield, Mass.
H. W. Eddy, *Div. M. M*....Springfield, Mass.
J. B. Weston, *For. Car Sh*.Springfield, Mass.
W. H. Russell, Jr., *Div. Supt*.E. Albany, N. Y.
T. B. Purvis, *Div. M. M*..East Albany, N. Y.
J. E. Doran, *For. Car Sh*..East Albany, N. Y.
Boston & Lowell R. R.
4-8½ g. 140 m. 82 lo. 2,565 cars.
C. S. Mellen, *Supt*..........Boston, Mass.
F. H. Nourse, *Pur. Agt*..........Boston, Mass.
J. F. Crockett, *Supt. T. & Mach*..Boston, Mass.
Boston & Maine R. R. 4-8½ g. 206 m. 89 lo. 2,209 c.
J. T. Furber, *Gen. Supt. & P. A*..Boston, Mass.
Geo. J. Fisher, *Pur. Agt*..........Boston, Mass.
Wm. Smith, *M. M*..........Boston, Mass.
D. C. Richardson, *M. C. B*....Lawrence, Mass.
Boston & N. Y. Air Line R. R. (*See N. Y., N. H. & H.*)
Boston & Providence R. R. 4-8½ g. 67 m. 52 lo. 1,006 c.
A. A. Folsom, *Gen. Supt. & P. A*. Boston, Mass.
Geo. Richards, *M. M*..........Roxbury, Mass.
Jno. Lightner, *M. C. B*..........Roxbury, Mass.
Bowling Green R. R. 4-8½ g. 6 m. 2 lo. 4 c.
Wm. A. Wiggins, *Gen. Man*. Bowling Green, O.
Wm. A. Wiggins, *Pur. Agt*..Bowling Green, O.
Bradford, Bordell & Kinzua R. R. 3 g. 42 m. 6 lo. 82 c.
Bradford, Eldred & Cuba. 3 g. 54 m. 6 l. 158 c.
Tonawanda Valley & Cuba. 3 g. 60 m. 5 lo. 31 c.
B. C. Williams, *Gen. Man. & P. A*..Brad'fd, Pa.
Jno. Delaney, *M. M. & C. B*..........Bradford, Pa.
Brattleboro' & Whitehall R. R. 3 g. 36 m. 3 lo. 56 c.
(*Operated by Central Vermont.*)
Breakwater & Frankford R. R. (*See Del., Md. & Va.*)
Bridgton & Saco River R. R. 2 g. 16 m. 2 lo. 19 c.
Wm. F. Perry, *Gen. Supt*..........Bridgton, Me.
M. M. Caswell, *M. M. & Pur. Agt*.Bridgton, Me.
Brighthope Ry. 3 g. 37 m. 4 lo. 193 cars.
Jas. R. Worth, *Supt*..........Richmond, Va.
P. M. Buckingham, *Pur. Agt* Richmond, Va.
A. Gary, *Supt. Way & Works*. Winterpock, Va.
Robt. Kredell, *M. M*..........Chester, Va.
Brooklyn, Bath & Coney Island R. R.
4-8½ g. 7 m. 8 lo. 36 cars.
Geo. A. Gunther, *Gen. Man*...Brooklyn, N. Y.
Aug. Wolff, *M. M*..........Brooklyn, N. Y.
Brooklyn, Flatbush & Coney Island Ry.
4-8½ g. 7 m. 7 lo. 54 c.
J. L. Morrow, *Supt. & P. A*...Brooklyn, N. Y.
Wm. Finley, *M. M*..........Brooklyn, N. Y.
Brooklyn & Rockaway Beach R. R.
4-8½ g. 3 m. 2 lo. 18 cars.
Wm. Warner, *Supt*.....East New York, N. Y.
Brunswick & Western R. R. 5 g. 172 m. 13 lo. 170 c.
H. S. Morse, *Gen. Man*..........Brunswick, Ga.
R. D. Meader, *Supt*..........Brunswick, Ga.
W. K. Wallace, *Pur. Agt*..........Brunswick, Ga.
W. R. Kline, *M. M*..........Brunswick, Ga.
Buff., N. Y. & Phil. R. R. 3 & 4-8½ g. 655 m. 120 l. 6,339 c.
Oliver Watson, *Gen. Man*..........Buffalo, N. Y.
Geo. S. Gatchell, *Gen. Supt*..........Buffalo, N. Y.
W. W. Halsey, *Asst. to G. Supt*..Buffalo, N. Y.
J. H. Poole, *Pur. Agt*..........Buffalo, N. Y.
Allen Vail, *Supt. M. P. & M*.....Buffalo, N. Y.
Buff. Div.: P. G. Dwyer, *Supt*..........Buffalo, N. Y.
Roch. Div.: R. M. Patterson, *Supt*. Rochester, N. Y.
N. G. Div.: J. W. Watson, *Supt*......Olean, N. Y.
Riv. Div.: A. Vandivort, *Supt*....New Castle, Pa.
Pitts. Div.: E. H. Witter, *Supt*......Oil City, Pa.
H. J. Bookhammer, *M. M*..........Oil City, Pa.
John Monks, *M. C. B*..........Oil City, Pa.
C. E. Turner, *M. M*..........Olean, N. Y.
Burlington, Cedar Rapids & Northern Ry.
4-8½ g. 713 m. 76 lo. 3,006 cars.
C. J. Ives, *Gen. Supt*..........Cedar Rapids, Ia.
Robt. Williams, *Supt*..........Cedar Rapids, Ia.
T. Stickney, *Pur. Agt*..........Cedar Rapids, Ia.
R. W. Bushnell, *M. M. & C. B*. Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 35 m. 4 lo. 64 c.
G. L. Linsley, *Gen. Man. & Supt*. Burlington, Vt.
F. G. Brownell, *M. M., M. C. B. & P. A.* do.
Burlington & Mo. Riv. R. R. (in Neb.) (*See C. B & Q.*)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 97 c.
Burlington & Western R. R. 3 g. 15 m. 38 c.
W. B. Jones, *Supt*..........Burlington, Ia.
Burlington & Ohio River R. R. 4-8½ g.
R. Tanner, *Pur. Agt*..........Chicago, Ill.

C

California Northern R. R. 4-8½ g. 26 m. 2 lo. 17 c.
Andrew J. Binney, *Gen. Man*..Marysville, Cal.
California Southern R. R. 4-8½ g. 127 m. 13 lo. 301 c.
J. N. Victor, *Supt*..........National City, Cal.
Mech. Supt..National City, Cal.
Cambridge & Seaford. (*See Penna. R. R.*; (4) *Div.*)
Camden Atlantic R. R. (*See Penna. R. R.*; (2) *Div.*)
Canada Southern Ry. (*See Mich. Cen.*; (2) *Div.*)
Canada Atlantic Ry. 4-8½ g. 82 m.
D. C. Linsley, *Man*..........Ottawa, Ont.
M. Donaldson, *M. M*..........Ottawa, Ont.
Canadian Pacific R. R. 4-8½ g. 1,742 m. 118 l. 2,726 c.
W. C. Van Horne, *Gen. Man*....Montreal, Que.
T. G. Shaughnessy, *Asst. G. M*. Winnipeg, Man.
T. R. F. Brown, *Mech. Supt*.....Montreal, Que.
T. G. Shaughnessy, *Pur. Agt*....Montreal, Que.
E. Div.: Archer Baker, *Gen. Supt*. Montreal, Can.
Tho. Irwin, *Mech. Supt*..........Brockville, Ont.
W. Div.: J. M. Egan, *Gen. Supt*..Winnipeg, Man.
F. C. Butterfield, *M. M. & M. C. B*. Winnipeg, Man.
Cape F'r & Yadkin Val. R. R. 4-8½ g. 47 m. 4 lo. 44 c.
J. S. Morrison, *Gen. Supt*....Fayetteville, N. C.
Isaac W. Clark, *M. M. & C. B*.. Fayetteville, N. C.
Cape Girardeau Southwestern Ry.
4-8½ g. 33 m. 3 lo. 20 cars.
Louis Houck, *Gen. Man*..Cape Girardeau, Mo.
W. A. Penney, *Gen. Supt*..Cape Girardeau, Mo.
W. H. Wheeler, *Pur. Agt*. Cape Girardeau, Mo.
Fred Glover, *M. M*..........Cape Girardeau, Mo.
Carolina Central R. R. (*See Ral. & Aug.*)
Carson & Colorado R. R. (*See Va. & Truckee*).
Catasauqua & Fogelsville. 4-8½ g. 25 m. 6 lo. 581 c.
C. W. Chapman, *Supt. & P. A*. Catasauqua, Pa.
J. Thomas, *M. M*..........Hokendauqua, Pa.
Chas. J. Holbach, *M. C. B*.....Catasauqua, Pa.
Catskill Mountain R. R. 3 g. 15 m. 2 lo. 26 cars.
Charles A. Beach, *Supt*..........Catskill, N. Y.
Cazenovia, Canastota & De Ruyter. (*See U., I. & E.*)
Central and South-Western Railroads (Ga.).
5 g. 1,115 m. 145 lo. 2,008 cars.
W. G. Raoul, *Pres*..........Savannah, Ga.
Wm. Rogers, *Gen. Supt*..........Savannah, Ga.
C. H. Carson, *Pur. Agt*..........Savannah, Ga.
Cen. Div.: D. D. Arden, *M. M*.....Savannah, Ga.
T. F. Warwick, *M. M*..........Augusta, Ga.
F. Devine, *M. C. B*..........Savannah, Ga.
So.-West'n Div.: T. D. Kline, *Supt*.....Macon, Ga.
D. M. Gugel, *M. M*..........Macon, Ga.
James A. Knight, *M. C. B*..........Macon, Ga.

Central R. R. of N. J. (*See Phil. & Read.; N. J. Cen. Div.*)
Central R. R. of S. C. (*See Wil. & Wel.*)
Central American & Pacific Ry. 3 g. 67 m. 1 lo. 11 c.
W. C. Fitzsimmons, *Gen. Supt*..Escuintla, Guat.
Central Branch Union Pac. (*See Mo. Pac.*; (3) *Div.*
Central Iowa Ry. 4-8½ g. 412 m. 50 lo. 1,959 cars.
C. E. Dudley, *Gen. Supt*......Marshalltown, Ia.
J. G. Johnston, *Asst. Gen. Sup*. Marshalltown, Ia.
W. R. Coppock, *Asst. Pur. Agt*. Marshalltown, Ia.
John Player, *M. M*..........Marshalltown, Ia.
T. L. Seevers, *M. C. B*..........Marshalltown, Ia.
Central Ontario Ry. 4-8½ g. 33 m. 4 lo. 66 cars.
G. W. McMullen, *Gen. Man*..........Picton, Ont.
James Falconar, *M. M*..........Trenton, Ont.
Central Pac. R. R. 4-8½ g. 4,303 m. 382 lo. 11,260 c.
A. N. Towne, *Gen. Man*....San Francisco, Cal.
J. A. Fillmore, *Gen. Supt*...San Francisco, Cal.
R. H. Pratt, *A. G. Supt*....San Francisco, Cal.
J. R. Watson, *Gen. Pur. Agt*..Sacramento, Cal.
A. J. Stevens, *Gen. M. M*.....Sacramento, Cal.
W. McKenzie, *Asst. G. M. M*..Sacramento, Cal.
Benj. Welch, *Gen. M. C. B*....Sacramento, Cal.
G. J. Turner, *Asst. G. M. C. B*. Sacramento, Cal.
Western; Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, *Supt*..........W. Oakland, Cal.
G. D. Welch, *M. M.* (W. Div.). W. Oakland, Cal.
W. B. Ludlow, *M. C. B.* (W. Div.) do.
S. Johnson, *M. M.* (T. Div.)..........Tulare, Cal.
D. Rutherford, *M. M.* (N. Rd.).S. Vallejo, Cal.
Sacramento; Oregon Divs.; and Cal. Pac. R. R.
J. B. Wright, *Supt*..........Sacramento, Cal.
M. W. Cooley, *M. M.* (*S. Div.*) Sacramento, Cal.
Truckee Div.: J. H. Whited, *Supt*. Wadsworth, Nev.
Geo. Gregg, *M. M*..........Wadsworth, Nev.
Wm. McPherson, *F. Car Sh*..Wadsworth, Nev.
Humb't Div.: G. W. Coddington, *Supt*. Carlin, Nev.
W. F. Smith, *M. M*..........Carlin, Nev.
J. C. Doughty, *For. Car Sh*..........Carlin, Nev.
Salt Lake Div.: A. G. Fell, *Supt*.....Ogden, Utah.
James Lamb, *M. M*..........Terrace, Utah.
A. Sherburne, *For. Car Sh*.....Ogden, Utah.
Colorado Div.: C. B. Seymour, *Supt*. Needles, Cal.
St. & Cop. R. R.: R. L. Myrick, *Supt*..Stockton, Cal.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, *Asst. Supt*....Los Angeles, Cal.
James Velsir, *M. M*..........Los Angeles, Cal.
T. T. Gilleland, *For. Car Sh*. Los Angeles, Cal.
Arizona Divs. (So. Pac.):
J. A. Muir, *Asst. Supt*..........Tucson, Ariz.
W. F. Smith, *M. M*..........Tucson, Ariz.
Rio Grande (S. Pac.) & El Paso (G. H. & S. A.) Divs.:
J. Campbell, *Supt*..........El Paso, Texas.
J. L. Bonner, *M. M*..........El Paso, Texas.
H. C. Standish, *For. Sh*.....El Paso, Texas.
Galveston, Harrisburg & San Antonio Ry.
E. G. Thompson, *Supt*..........Houston, Tex.
San Anto. Div.: W. G. Van Vleck, *Supt.*, and
J. J. Ryan, *M. M*..........San Antonio, Tex.
Houston Div.: H. Flanders, *Supt*..Harrisburg, Tex.
D. T. Davis, *M. M*..........Harrisburg, Tex.
Louisiana Div.: W. Irwin, *Supt*.....Houston, Tex.
D. C. Smith, *M. M*..........Houston, Tex.
J. M. Mather, *M. C. B*..........Houston, Tex.
El Paso Div.: Jas. Campbell, *Supt*. El Paso, Tex.
J. L. Bonner, *M. M*..........El Paso, Tex.
Central Texas & N'w'n R. R. (*See Hous. & Tex. Cen.*)
Central Vermont R. R. 4-8½ g. 673 m. 136 lo. 2,789 c.
J. W. Hobart, *Gen. Man*..........St. Albans, Vt.
J. M. Foss, *Asst. Gen. Supt. & M. M*. St. Albans, Vt.
No. Div.: I. B. Futvoye, *Supt*.....St. Johns, P. Q.
Rut. Div.: J. Burdett, *Supt*..........Rutland, Vt.
N. L. Davis, *M. M. & C. B*..........Rutland, Vt.
Brattleboro & Whitehall R. R., and
Brat. Div.: E. F. Brooks, *Supt*...Brattleboro, Vt.
New London No'n R. R. 143 m. 22 lo. 303 c.
C. F. Spaulding, *G. Supt. & P. A*. New London, Ct.
I. W. Dow, *M. M*..........New London, Ct.
S. O. Banks, *M. C. B*..........New London, Ct.
Chagrin Falls & Southern R. R. 3 g. 6 m. 1 lo. 12 c.
W. Hutchings, *Gen. Man*.....Chagrin Falls, O.
J. W. Williams, *Gen. Supt*....Chagrin Falls, O.
Charleston & Savannah Ry. 5 g. 115 m. 17 lo. 190 c.
H. S. Haines, *Gen. Man*..........Savannah, Ga.
C. S. Gadsden, *Gen. Supt*.....Charleston, S. C.
H. A. Ulmo, *M. M*..........Savannah, Ga.
Charlotte, Columbia & Augusta R. R. (*See Rich. & D.*)
Chateaugay R. R. 3 g. 34 m. 7 lo. 365 cars.
A. L. Inman, *Gen. Man*..........Plattsburg, N. Y.
J. M. Davies, *Supt*.....Lyon Mountain, N. Y.
M. L. French, *Asst. Supt*....Plattsburg, N. Y.
Chattaroi Ry. 4-8½ g. 51 miles 11 loco. 483 cars.
C. H. Rockwell, *Gen. Man. & P. A*. Ashland, Ky.
J. R. Martin, *M. M*..........Ashland, Ky.
Joseph P. Burleigh, *M. C. B*..........Ashland, Ky.
Cheraw & Chester R. R. (*See Rich. & Dan.*; (2) *Div.*)
Cheraw & Darlington R. R. (*See Wil. & Wel.*)
Cheraw & Salisbury R. R. (*See Wil. & Wel.*)
Cherokee R. R. (*See East & West.*)
Cherry Valley R. R. 4-8½ g. 6 m. 3 lo. 6 cars.
E. T. Herndon, *Supt*..........Midland, Mo.
Chesapeake, Ohio & South-Western.
4-9 g. 398 m. 62 lo. 1,345 c.
D. W. C. Brown, *Gen. Supt*..........Louisville, Ky.
H. E. Huntington, *Pur. Agt*.....Louisville, Ky.
J. E. Reeves, *Supt. Trans*.....Louisville, Ky.
R. H. Briggs, *Supt. M. P*....Elizabethtown, Ky.
D. L. Weaver, *M. M*..........Elizabethtown, Ky.
Chas. Daniel, *M. M*..........Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 169 l. 5,120 c.
C. W. Smith, *Gen. Man*..........Richmond, Va.
D. A. Sweet, *Asst. to Gen. Man*. Richmond, Va.
A. S. Emmons, *Pur. Agt*..........Richmond, Va.
T. L. Chapman, *Supt. M. P*..........Richmond, Va.
Eastern Div.: A. H. Wood, *Supt*..Richmond, Va.
J. N. King, *M. C. B*..........Richmond, Va.
J. B. Pierce, *M. M*..........Richmond, Va.
Hunt. Div.: W. B. Ryder, *Supt*...Hinton, W. Va.
W. H. Thomas, *M. M*...Huntington, W. Va.
H. C. Bassinger, *M. C. B*. Huntington, W. Va.
Lex. Div.: J. D. Yarrington, *Supt*..Lexington, Ky.
S. R. Tuggle, *M. M*..........Lexington, Ky.
K. C. Div.: G. W. Bender, *Supt*..Lexington, Ky.
A. H. Watts, *M. M*..........Lexington, Ky.
Cheshire R. R. 4-8½ g. 80 m. 31 lo. 531 cars.
R. Stewart, *Gen. Man*..........Keene, N. H.
H. H. Stone, *Pur. Agt*..........Keene, N. H.
F. A. Perry, *M. M*..........Keene, N. H.
A. E. Howard, *M. C. B*..........Keene, N. H.
Chester & Lenoir Ry. (*See Rich. & Dan.*; (3) *Div.*)
Chicago, Bur. & Kan. City Ry. (*See C. B. & Q.*)
Chicago, Burlington & Quincy R. R.
4-8½ g. 3,608 m. 545 lo. 21,012 cars.
T. J. Potter, *Gen. Man*..........Chicago, Ill.
(1) C., B. & Q., East of Mo. Riv.
H. B. Stone, *Asst. Gen. Man*..........Chicago, Ill.
Wm. Irving, *Gen. Pur. Agt*..........Chicago, Ill.
G. W. Rhodes, *Supt. M. P*..........Aurora, Ill.
Wm. Forsyth, *Mech. Eng*..........Aurora, Ill.
Ill. Divs.: J. D. Besler, *Supt*..........Galesburg, Ill.
Chi. Div.: Geo. Alexander, *Supt*..........Aurora, Ill.
L. E. Johnson, *M. M*..........Aurora, Ill.
Galesburg Div.: F. C. Rice, *Supt*. Galesburg, Ill.
Robert Colville, *M. M*..........Galesburg, Ill.
St. L. Div.: S. E. Crance, *Supt*..Beardstown, Ill.
A. Forsyth, *M. M*..........Beardstown, Ill.
Ia. & Mo. Divs.: W. F. Merrill, *Supt*. Burlington, Ia.
East. Div.: O. E. Stewart, *Supt*..Burlington, Ia.
Joel West, *M. M*..........Burlington, Ia.
Mid. Div.: J. B. Maxon, *Supt*.....Ottumwa, Ia.
West'n Div.: J. H. Duggin, *Supt*....Creston, Ia.
C. W. Eckerson, *M. M*..........Creston, Ia.
Chi., B. & Kan. C'y and St. L., Keo. & No.-W'n Rys.
Robt. Law, *Gen. Supt*..........Keokuk, Ia.
W. H. Bartlett, *M. M*..........Burlington, Ia.
(2) C. B. & Q., West of Mo. Riv.
G. W. Holdrege, *Asst. Gen. Man*. Omaha, Neb.
C. M. Wead, *Supply Agt*..........Omaha, Neb.
D. Hawksworth, *M. M*..........Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
T. E. Calvert, *Gen Supt*..........Lincoln, Neb.
D. E. Thompson, *Supt*..........Lincoln, Neb.
E. Bignell, *M. M*..........Lincoln, Neb.
R. V. Div.: A. Campbell, *Supt*......McCook, Neb.
A. & N. Div.: J. McConniff, *Supt*...Lincoln, Neb.
Chicago, Fairchild & Eau Claire R. R.
4-8½ g. 20 m. 3 lo. 28 cars.
N. C. Foster, *Gen. Man*..........Fairchild, Wis.
C. I. Wickersham, *Pur. Agt*..........Chicago, Ill.

Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 4,528 m. 626 lo. 19,018 cars.
S. S. Merrill, *Gen. Man*..........Milwaukee, Wis.
R. Miller, *Asst. Gen. Man*...Milwaukee, Wis.
J. T. Clark, *Gen. Supt*..........Milwaukee, Wis.
J. T. Crocker, *Pur. Agt*..........Milwaukee, Wis.
J. M. Lowry, *Gen. M. M*..........Milwaukee, Wis.
E. Fairbairn, *M. M*..........Milwaukee, Wis.
John Bailie, *Supt. Car Dept*...Milwaukee, Wis.
(1) H. C. Atkins, *Asst. Gen. Supt*..Milwaukee, Wis.
Chi. Div.: Geo. O. Clinton, *Supt*.....Chicago, Ill.
La Crosse Div.: W. G. Collins, *Supt*. Milwaukee, Wis.
C. Bluffs Div.: A. J. Earling, *Supt*... Marion, Ia.
P. du C. & M. Pt. Divs.:
R. B. Campbell, *Supt*..........Milwaukee, Wis.
(2) C. H. Prior, *Asst. Gen. Supt*..Minneapolis, Minn.
H. & D. Div.: M. W. Kellie, *Supt* do.
J. O. Pattie, *M. M*..........Minneapolis, Minn.
Ia. & Minn. Div.: H. R. Williams, *Supt*. do.
S. Minn. Div.: F. D. Underwood, *Supt*. Lacrosse, Wis.
Riv. & Dub. Divs.: C. W. Case, *Supt*. Dubuque, Ia.
S. Charnley, *M. M*..........Dubuque, Ia.
Ia. & Da. Div.: G. W. Sanborn, *Supt*. Mason City, Ia.
S. Cy. & Da. Div.: W. J. Underwood, *Supt*. Sioux Cy, Ia.
F. H. Moulton, *M. M*..........Yankton, Dak.
J. M. Horan, *For*..........Yankton, Dak.
(3) D. A. Olin, *Asst. Gen. Supt*..........Racine, Wis.
R. & S. W. Divs.: D. L. Bush, *Supt*...Racine, Wis.
John Taylor, *M. M*..........Racine, Wis.
(4) Northern Div.: L. B. Rock, *Supt*. Milwaukee, Wis.
Wm. E. Kittredge, *M. C. B*..Milwaukee, Wis.
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 309 lo. 8,367 cars.
R. R. Cable, *Pres. & Gen. Man*....Chicago, Ill.
A. Kimball, *V. P. & Gen. Supt*.....Chicago, Ill.
H. F. Royce, *Asst. G. Supt*..........Davenport, Ia.
F. A. Marsh, *Pur. Agt*..........Chicago, Ill.
T. B. Twombly, *Gen. M. M*..........Chicago, Ill.
B. K. Verbryck, *Gen. M. C. B*..........Chicago, Ill.
Ill. Div.: R. H. Chamberlin, *Supt*.....Chicago, Ill.
R. Biester, *M. M*..........Chicago, Ill.
Sam'l Pullman, *M. C. B*..........Chicago, Ill.
Ia. Divs.: Jno. Given, *Supt*..........Des Moines, Ia.
J. G. Crockett, *M. M*..........Stuart, Ia.
Jas. E. Morrill, *M. M*..........Davenport, Ia.
Chas. M. Leonard, *M. C. B*......Davenport, Ia.
K. & Des. M. Div.: Jno. Given, *Supt*..Des Moines, Ia.
S. W. Wakefield, *M. M*..........Keokuk, Ia.
Henry Kummer, *M. C. B*..........Keokuk, Ia.
So.-Wn. Div.: G. F. Walker, *Supt*....Trenton, Mo.
R. O. Carscadin, *M. M*..........Trenton, Mo.
Chas. R. Best, *M. C. B*..........Trenton, Mo.
Chicago, Saginaw & Canada R. R. (*See Det., L. & N.*)
Chicago, St. Louis & New Orleans R. R. (*See Ill. Cen.*)
Chicago, St. Louis & Pittsburg R. R.
4-9 g. 635 m. 202 lo. 3,510 cars.
James McCrea, *Manager*..........Columbus, O.
Wm. Mullins, *Gen. Pur. Agt*....Pittsburg, Pa.
Edward B. Wall, *Supt. M. P*....Columbus, O.
1, 3 & 5 Divs.: J. F. Miller, *Supt*. Richmond, Ind.
Robert Curtis, *M. M*..........Columbus, O.
J. L. Copeland, *G. F Car Shops*. Columbus, O.
W. C. Arp, *Gen. For*.......Indianapolis, Ind.
2 & 4 Divs.: Chas. Watts, *Supt*. Logansport, Ind.
W. W. Reynolds, *M. M*.....Logansport, Ind.
Chas. H. Starr, *G F C. Shops*, Logansport, Ind.
Chicago, St. Louis & Wn. R. R. 4-8½ g. 88 m. 11 lo. 1,799 c.
F. E. Hinckley, *Gen. Man*..........Chicago, Ill.
A. H. Crocker *Supt*..........Streator, Ill.
J. N. Chilson, *M. C. B*..........Streator, Ill.
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,280 m. 181 lo. 5,221 cars.
J. M. Whitman, *Gen. Supt*......St. Paul, Minn.
W. H. S. Wright, *Pur. Agt*......St. Paul, Minn.
Matt. Ellis, *M. M*..........St. Paul, Minn.
J. J. Ellis, *Asst. M. M*..........St. Paul, Minn.
H. L. Preston, *M. C. B*..........Hudson, Wis.
Ea. & No. Div.: A. A. Hobart, *Supt*. St. Paul, Minn.
St. Paul and Sioux City Div.:
H. Spencer, *Supt*..........St. James, Minn.
H. C. Anderson, *Asst. M. M*.....Sioux Cy, Ia.
Neb. Div.: Geo. V. Morford, *Supt*....Omaha, Neb.
Jas. McCabe, *Asst. M. M*..........Omaha, Neb.
Chic., Tex. & Mexican Cent. Ry. (*See Gulf, C. & S. F.*)
Chicago & Alton R. R. 4-8½ g. 849 m. 213 lo. 6,168 c.
C. H. Chappell, *Gen. Man*..........Chicago, Ill.
T. L. Bates, *Supt. of Trans*...Bloomington, Ill.
A. V. Hartwell, *Pur. Agt*..........Chicago, Ill.
Wm. Wilson, *Supt. of Mach*...Bloomington, Ill.
Jos. Townsend, *G. For. Car Dept*. do.
Chi. Div.: A. M. Richards, *Supt*. Bloomington, Ill.
St. L. & K. C. Div.: S. D. Reeves, *Supt*. Roodhouse, Ill.
L. H. Miller, *M. M*..........Slater, Mo.
Chicago & Atlantic Ry. 4-8½ g. 269 m.
J. C. Williams, *Gen. Supt*..........Chicago, Ill.
Geo. A. Hill, *M. M. & M. C. B*..Huntington, Ill.
West. Div.: J. H. Parsons, *Supt*....Chicago, Ill.
East. Div.: J. H. Tinney, *Supt*..Huntington, Ind.
Chi. & East'n Ill. 4-8½ g. 252 m. 56 lo. 3,500 cars.
O. S. Lyford, *Gen. Supt*..........Chicago, Ill.
D. R. Patterson, *Pur. Agt*..........Chicago, Ill.
P. W. Drew, *M. Trans*..........Chicago, Ill.
Allen Cooke, *M. M*..........Danville, Ill.
Chicago & Grand Trunk Ry. (*See Grand Trunk.*)
Chicago & Great Southern Ry.
4-8½ g. 124 m. 4 lo. 122 c.
Henry Crawford, *Gen. Man*........Chicago, Ill.
H. Crawford, Jr., *Supt*..........Chicago, Ill.
Chicago & Iowa R. R. 4-8½ g. 104 m. 16 lo. 237 cars.
T. J. Potter, *Gen. Man*..........Chicago, Ill.
W. H. Holcomb, *Gen. Supt*........Rochelle, Ill.
H. S. Bryan, *M. M*..........Aurora, Ill.
Chicago & Northwestern Ry.
4-8½ g. 3,761 m. 637 lo. 21,000 cars.
Marvin Hughitt, *2d V. Prs. & G. M*. Chicago, Ill.
C. C. Wheeler, *Gen. Supt*..........Chicago, Ill.
W. B. Linsley, *Ass't Gen. Supt*....Chicago, Ill.
R. W. Hamer, *Pur. Agt*..........Chicago, Ill.
Geo. W. Tilton, *Supt. M. P. & M.*; and
Wm. Campbell, *A. Supt. M. P. & M*. Chicago, Ill.
Wis. and Mil. Divs. & Sheboygan & W'n Ry.:
Ed. J. Cuyler, *Supt*..........Chicago, Ill.
Gal. Div.: Chas. Murray, *Supt*.......Chicago, Ill.
Pen'a Div.: W. F. Fitch, *Supt*.....Escanaba, Mich.
J. Symons, *M. M*..........Escanaba, Mich.
Mad. Div.: C. A. Swineford, *Supt*. Baraboo, Wis.
Minn. & Dak. Divs.: S. Sanborn, *Asst. Gen. Supt*.
and W. A. Scott, *M. M*..........Winona, Minn.
Dak. Cen. Ry.: J. S. Oliver, *Supt*....Huron, Dak.
Ia. Div.: H. G. Burt, *Supt*..........Boone, Ia.
Geo. W. Lowe, *M. M*..........Clinton, Ia.
No. Ia. Div.: M. Hopkins, *Supt*...Eagle Grove, Ia.
Win. & St. P. Div.:
W. P. Cosgrave, *Supt*..........Winona, Minn.
Chicago & West Michigan:
4-8½ g. 409 m. 43 lo. 1,345 cars.
Geo. C. Kimball, *V. P. & G. Man*. Muskegon, Mich.
A. M. Nichols, *Gen. Supt*......Gd. Rapids, Mich.
Edw. Hill, *Pur. Agt*..........Muskegon, Mich.
W. F. N. Davis, *M. M*..........Muskegon, Mich.
Chicago & West'n Ind. R. R. 4-8½ g. 51 m. 12 lo. 150 c.
James Walsh, *Gen. Man*..........Chicago, Ill.
Cincinnati, Columbus & Hocking Val. Ry.
4-9 g. 25 m. 2 lo. 77 cars.
D. P. Hyatt, *Gen Man*..........Dayton, O.
Cin., Georgetown & Portsmouth. 3 g. 35 m. 3 lo. 45 c.
M. Simmons, *Supt*..........Cincinnati, O.
J. C. Homer, *M. M*..........Cincinnati, O.
Cincinnati & Green River Ry. 3 g. 11 m. 2 lo. 41 c.
G. B. Harper, *Supt*..........Grove, Ky.
Geo. Lewis, *M. M*..........Grove, Ky.
Cin., Hamilton & Dayton R. R. 4-9 g. 352 m. 92 l. 2,932 c.
C. J. Hepburn, *Gen. Supt*.......Cincinnati, O.
P. Hickey, *Pur. Agt*..........Cincinnati, O.
John Black, *Gen. M. M*..........Lima, O.
W. H. H. Allison, *M. C. B*.......Cincinnati, O.
Day. & Mich. Div.: W. F. Stark, *Supt*. Toledo, O.
C. R. & C. Div.: W. S. Brewer, *M. M*. Richm'd, Ind.
Cincinnati, Indianapolis, St. Louis & Chicago Ry.
4-8½ g. 384 m. 71 lo. 3,279 cars.
J. W. Sherwood, *Supt*..........Indianapolis, Ind.
Geo. Tozzer, *Pur. Agt*..........Cincinnati, O.
J. S. Patterson, *M. of Mach. & M. C. B*. Cincinn., O.
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 846 m. 123 lo. 3,464 cars.
John Scott, *Gen. Man*..........Cincinnati, O.
Richard Carroll, *Gen. Supt*.......Cincinnati, O.
R. W. Healey, *Gen. Pur. Agt*.....Cincinnati, O.
James Meehan, *S. M. P. & M*... Cincinnati, O.

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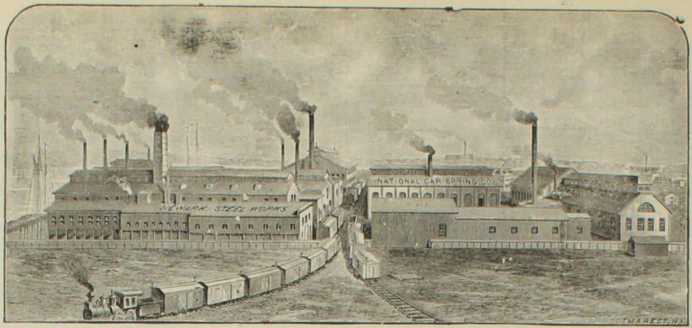

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OFFICE, 13 BARCLAY STREET, NEW YORK.

HOPKINS VERSUS LE ROY!

THE QUESTION.

Does the Le Roy Journal Bearing Company "stand ready" to make what are commonly known as Hopkins Journal Bearings, because of numerous disgusting failures, resulting from the use of the weak, gridiron arrangement known as the Le Roy Bearing heretofore made and sold by them, and the consequent necessity of going out of business or giving their customers a really good bearing even if they have to "pirate" the invention for which a patent was granted to Hopkins that has been declared valid by both the Eastern and Western Railroad Association?

Does the Le Roy Company expect to build up a business by infringing Hopkins' Patent, and selling bearings, and a lawsuit with them?

In the recent interference patent fight between Hopkins and Le Roy, the Commissioner of Patents, in his final decision, which was rendered August 31, 1883, says:

"On the broad claim, as well as the specific claim covering the device embodying not only the broad but the specific invention of a journal bearing with a soft metal lining, with ridges or projections so arranged that, upon being brought in contact with the axle, the ridges or projections will yield and spread out so as to make a perfectly-fitting box, priority of invention must be awarded to Hopkins."

As to the specific arrangement for which priority of invention was awarded to Le Roy, all will perceive that the broad claim for which priority of invention is awarded to Hopkins, and the very broad claim embodied in the patent granted him Oct. 16, 1883, in the following words: "A Journal Bearing made of two different metals, one of soft or yielding nature, and the other of a hard or unyielding nature, the soft or yielding carrying ridges or spurs which receive the initial pressure of the journal, and by the rolling action of the same and the load pressure upon the bearing becomes crushed down and spread in conformity with the contour thereof, as described, whereby the surfaces in wearing contact are adjusted to each other, substantially as specified,"

COVERS THE WHOLE CASE

AN OLD ADAGE SAYS:
"SUE A BEGGAR AND CATCH A LOUSE."

Will Mr. McLean, of the so-called Le Roy Journal Bearing Co., give to Mr. Hopkins and to Railroad Companies and Car-Builders any reliable proof that his Company is in reality anything else than an irresponsible piratical concern (see his advertisement) that is absolutely judgment proof, and any guarantees it may offer against suits by Hopkins are not perfectly worthless, and in so doing will he talk plain, honest common sense, instead of craftily stringing together a lot of words (see his advertisement) that mean nothing unless they mislead?

No invention ever did or can infringe any patent. It is not the invention in any case that infringes, but the making, selling or using of a thing patented without the right to do so. Talk about making an offer to settle a point that does not exist is as cheap as it is misleading and worthless.

As to his being the prior inventor of Bearings with soft metal ridges for receiving the Initial pressure of the Journal, and leaves him absolute master of the situation.

All parties are hereby warned that my rights under said Letters Patent will be enforced.

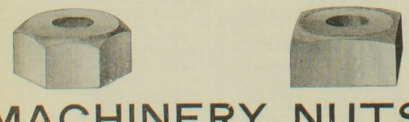
D. A. HOPKINS, Patentee and Manufacturer,

113 Liberty Street, - - - - New York.

Rhode Island Tool Company,

MANUFACTURERS OF

COLD PUNCHED, SQUARE AND HEXAGON



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John Richardson, M. C. B. Cincinnati, O.
A. Thomson, M. M. Chattanooga, Tenn.
Ala. Gr. S'n Div.: D. McLaren, Supt., and
George Manuell, M. M. Chattanooga, Tenn
Fred Morgan, M. C. B. Chattanooga, Tenn
V. & M. Div.: E. F. Raworth, Supt. and
James B. Browne, M. M. Vicksburg, Miss
V.S. & P. Div.: F. Y. Dabney, Supt. Monroe, La
W. Bell Smith, M. M. & C. B. Monroe, La.
New Orleans & North-Eastern R. R.
T. S. Williams, Supt. New Orleans, La.
Cincinnati Northern Ry. (See Tol., Cin. & St. L.
Cincinnati, Selma & Mobile R.R. 5 g. 71 m. 6 lo. 148 c.
D. McLaren, Spt. Selma, Ala.
H. L. Wright, Pur. Agt. Selma, Ala.
J. M. Levis, M. M. Marion, Ala.
Cincinnati, Van Wert & Michigan R. R.
4-9 g. 39 m. 4 lo. 64 cars.
E. C. Dawes, Gen. Supt. Cincinnati, O.
Cin., Wabash & Mich. Ry. 4-8½ g. 165 m. 13 lo. 402 c.
Norman Beckley, Gen. Man. & P. A. Elkhart, Ind.
O. W. Lamport, Supt. Wabash, Ind.
S. B. Tinker, M. M. & M. C. B. Wabash, Ind
Cin., Wash. & Balt. 4-8½ g. 312 m. 65 lo. 1,422 cars
Jas. H. Stewart, Gen. Man. Cincinnati, O.
Edw. Evans, M. M. Chillicothe, O.
T. G. Duncan, Supt. Car Dept. Zaleski, O.
Cincinnati, Wheeling & New York R.R. 4-8½ g. 13 m.
Thos. R. Sharp, Pres. New York, N. Y.
Cincinnati & Eastern Ry. 3 g. 100 m. 7 lo. 133 cars.
S. Woodward, Gen. Man. Cincinnati, O.
G. H. Wilber, Gen. Sup. & Pur. Agt. Cincinnati, O.
P. W. Naughton, M. M. Newtown, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
John V. Patton, Gen. Man. Newport, Ky.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 45 cars.
A. H. Kunst, Pres. & Gen. Man. Weston, W. Va.
Sam. A. Steel, M. M. Weston, W. Va.
F. Dillie, M. C. B. Nottingham, O.
Cleveland, Columbus, Cincinnati & Indiana and Indianapolis & St. Louis Rys. and Dayton & Union R. R. 4-8½ g. 785 m. 246 lo. 7,988 cars.
E. B. Thomas, Gen. Man. Cleveland, O.
J. L. Yale, Pur. Agt. Cleveland, O.
W. F. Turreff, Gen. M. M. Cleveland, O.
Col. & Cin. Div.: Robt. Blee, Supt. Cleveland, O.
Wm. Garsting, M. M. Cleveland, O.
A. G. Steinbrenner, G. For. Car Dept. do.
Ind'p'lis Div.: John O. Ewan, Supt. Ind'polis, Ind
T. W. Ranson, M. M. Brightwood, Ind.
N. Mark, G. For. Car Dept. Brightwood, Ind.
Ind. & St L Ry.: Tho. Burrows, Supt. St. Louis, Mo.
T. W. Ranson, M. M. & C. B. Brightwood, Ind.
Day. & Un. Rd.: J. H. Barrett, Supt. Cincinnati, O
H. S. Gordon, For. M. Shops Dayton, O.
Cleveland, Delphos & St. Louis R. R.
3 g. 56 m. 3 lo. 39 cars.
I. H. Burgoon, Gen. Man. Delphos, O.
B. F. Marshall, M. M. Delphos, O.
Cleveland, Indiana & St. Louis R. R.
4-8½ g. 19 m. 2 lo. 20 cars.
J. A. Larned, Rec. & Supt. Anderson, Ind.
Cleveland, Mt. Vernon & Delaware R. R.
4-9 g. 144 m. 24 lo. 828 c.
N. Monsarrat, Gen. Supt. Akron, O.
G. M. Taylor, M. M. & C. B. Mt. Vernon, O.
Cleve., Youngstown & Pitts. R. R. 3 g. 30 m. 3 lo. 138 c.
D. T. Lumley, Gen. Supt. Alliance, O.
C. H. Dorman, M. M. & M. C. B. Alliance, O.
Cleveland, Lorain & Wheeling Ry.
4-8½ g. 158 m. 31 lo. 1,878 cars.
Oscar Townsend, Gen. Man. Cleveland, O.
Wm. Thornburg, Supt. Lorain, O.
W. A. Stone, M. M. Lorain, O.
Cleve. & Marietta R. R. (See Wheel. & Lake Erie.)
Cleveland & Pittsburg. (See Penna. Co.; (4) Div.)
Clifton & Port Hudson R. R. 4-8½ g. 22 m. 3 lo. 12 c.
D. W. Pipes, Supt. Clinton, La.
W. F. Lockwood, M. M. Clinton, La.
Clove Branch R. R. 4-8½ g. 4 m. 1 lo. 61 cars.
C. L. Kimball, Supt. Mattewan, N. Y.
W. G. Vanbuskirk, M. M. Dutchess Jc., N. Y.
Coburg, Peterborough & Marmora Ry.
5-6 g. 47 m. 5 lo. 255 cars.
Jas. R. Barber, Gen. Supt. Cobourg, Ont.
Jas. Clark, M. M. Cobourg, Ont
John Tinney, M. C. B. Cobourg, Ont.
Colorado Central R. R. (See Un. Pac.; (4) Div.)
Columbia & Greenville R. R. (See Rich. & D.; (3) Div.)
Columbia & Puget Sound R.R. 3 g. 21 m. 7 lo. 114 c.
J. M. Colman, Gen. Supt. Seattle, Wash. Ter.
Columbus, Hocking Valley & Toledo Ry.
4-9 g. 324 m. 90 lo. 7,353 cars.
G. R. Carr, Gen. Supt. Columbus, O.
W. M. Greene, Pur. Agt. Columbus, O.
Ira G. Hutchins, M. M. Columbus, O.
J. M. Rockafield, M. C. B. Columbus, O.
Tol. Div.: M. T. Seymour, Supt. Columbus, O.
Hock. V. Div.: M. P. L. Booth, Supt. Columbus, O.
Ohio Riv. Div.: C. D. Norris, Supt. Logan, O.
Columbus & Eastern R. R. In progress
J. E. Redfield, Pres. Columbus, Ohio.
Columbus & Maysville Ry. (See Cin. & East.)
Columbus & Rome R. R. 3 g. 33 m. 3 lo. 30 cars.
M. E. Gray, Supt. Columbus, Ga.
Columbus & Western Ry. 5 g. 89 m. 2 lo. 53 cars
E. A. Flewellen, Gen. Man. Columbus, Ga.
R. A. Bridges, M. M. Opelika, Ala.
Concord R. R. 4-8½ g. 141 m. 38 lo. 1,235 cars.
H. E. Chamberlain, Supt. & P. Agt. Concord, N. H.
J. T. Gordon, M. M. & C. B. Concord, N. H.
Concord & Claremont R. R. (See Northern of N. H.
Conn. Riv. and Ver. Val. R. Rs. 4-8½ g. 130 m. 42 lo. 554 c.
J. Mulligan, Supt. & Pur. Agt. Springfield, Mass.
W. H. Stearns, M. M. Springfield, Mass.
Robert Hitchcock, M. C. B. Springfield, Mass.
Conn. & Passumpsic Rivers R. R. (See Passumpsic.)
Connotton Valley R. R. 3 g. 160 m. 26 lo. 997 cars.
Samuel Briggs, Gen. Man. Cleveland, O.
B. C. Bosworth, M. M. Canton, O.
Cooperstown & Susquehanna Valley R. R.
4-8½ g. 16 m. 2 lo. 14 cars.
Andrew Shaw, Pres. Cooperstown, N. Y.
A. Mumford, M. M. Cooperstown, N. Y.
Corning, Cowanesque & Antrim Ry. (See Syr., G. & C.)
Cornwall R. R. 4-8½ g. 12 m. 5 lo. 166 cars
J. M. Havard, G. Supt. & M. M. Lebanon, Pa.
Levi Blonch, M. C. B. Lebanon, Pa.
Coudersport & Port Allegheny R. R.
3 g. 17 m. 2 lo. 50 cars.
B. A. McClure, Gen. Supt. Coudersport, Pa.
Credit Valley Ry. 4-8½ g. 184 m. 22 lo. 535 cars.
Wm. Whyte, Gen. Supt. Toronto, Ont.
John Macnab, Pur. Agt. Toronto, Can.
H. G. Taylor, Mech. Supt. Toronto, Can
Crooked Creek R. R. 3 g. 9 m. 1 lo. 37 cars.
Walter C. Willson, Gen. Man. Webster City, Ia.
Geo. W. Post, Pur. Agt. Lehigh, Ia
Crown Point Iron Co. R. R. 3 g. 13 m. 4 lo. 113 c.
A. L. Inman, Gen. Man. Plattsburg, N. Y.
H. L. Reed, Pur. Agt. Crown Point, N. Y.
J. M. Davies, Supt. & M. M. Crown Point, N. Y.
J. C. Sherman, M. C. B. Crown Point, N. Y.
Cumberland Ry. 4-8½ g. 32 m. 1 lo. 64 c.
J. A. Killam, Gen. Man. Parsboro, N. S.
K. McKinnon, M. M. Parsboro, N. S.
Cumberland Valley R. R. 4-9 g. 125 m. 21 lo. 451 cars.
J. F. Boyd, Supt. Chambersburg, Pa.
A. S. Hull, M. M. Chambersburg, Pa.
C. Wieke, M. C. B. Chambersburg, Pa.
Cumberland & Maurice River R. R. 4-8½ g. 20 m.
L. H. Dowdney, Supt. Port Morris, N. J.
Cumberland & Penn. R. R. 4-8½ g. 55 m. 28 lo. 625 c.
P. L. Burwell, Gen. Supt. & P. A. Cumberland, Md.
N. W. Howson, Mast. of Mach. Mt. Savage, Md.
Nathan Binix, M. C. B. Mt. Savage, Md.

D

Danville & New River R. R. 3 g. 43 m. 2 lo. 30 c.
W. T. Sutherlin, Gen. Man. Danville, Va.
J. F. Morton, M. M. Danville, Va.
Danbury & Norwalk R. R. 4-8½ g. 36 m. 7 lo. 112 c.
C. M. Crawford, G. Supt. & P. A. S. Norwalk, Ct.
N. M. George, M. M. & C. B. Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. M. Shivler, Supt. Leakesville, N. C.
Danville, Olney & O. R. R.R. 4-8½ g. 110 m. 5 lo. 83 c.
Chas. Howard, Rec. & Man. Olney, Ill.
W. A. Bell, M. M. & C. B. Kansas, Ill.
Dayton & Union R. R. (See Clev., Col., Cin. & Ind.)
Dayton & Michigan R. R. (See Cin., Ham. & Day.)
Del. Lackawanna & W. and N. Y., Lack. & W. R. Rs.
4-8½ g. 930 m. 436 lo. 31,989 cars.
Wm. F. Halstead, Gen. Supt. Scranton, Pa.
G. W. B. Cushing, Pur. Agt. New York, N. Y.
Walter Dawson, Mast. of Mach. Scranton, Pa.
Robt. McKenna, M. C. B. Scranton, Pa.
Bloomsb'g Div.: C. Graham, M. M. Kingston, Pa.
Utica Div.: A. C. Salisbury, Supt. Utica, N. Y.
Thos. Thatcher, M. M. Utica, N. Y.
Morris & Essex Div.; Sussex; P. & D. and C. R. Rs.
A. Reasoner, Supt. Hoboken, N. J.
W. H. Lewis, M. M. Kingsland, N. J.
J. W. Baker, Mast. Car Rep. Dover, N. J.
Oswego & Syracuse Div.:
W. B. Phelps, Supt. Oswego, N. Y.
Jas. Buchanan, M. M. Syracuse, N. Y.
Syracuse, Binghamton & New York R. R.
4-8½ g. 81 m. 20 lo. 598 cars.
W. K. Niver, Gen. Supt. Syracuse, N. Y.
Jas. Buchanan, M. M. Syracuse, N. Y.
Cayuga Div.: W. R. Humphrey, Supt. Ithaca, N. Y.
Delaware, Maryland & Virginia R. R.
4-8½ g. 101 m. 7 lo. 145 cars.
Tho. Groom, Supt. Lewes, Del.
Geo. Messick, M. M. Lewes, Del.
W. H. Virden, M. C. B. Lewes, Del.
Delaware River R. R. 4-8½ g. 20 m. 3 lo. 4 cars.
E. H. Green, Supt. Pedricktown, N. J.
Delaware Western R. R. (See Balt. & Phil.)
Delaware & Chesapeake R. R. (See Penna.; (4) Div.)
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 634 m. 180 lo. 10,799 cars.
C. F. Young, Gen. Man. Honesdale, Pa.
C. F. Young, Pur. Agt. Albany, N. Y.
R. C. Blackall, Supt. of Mach. Albany, N. Y.
Susq. Div.: C. D. Hammond, Supt. Albany, N. Y.
Tho. Howard, M. M. Oneonta, N. Y.
J. R. Skinner, M. C. B. Oneonta, N. Y.
Sar. & Ch. Divs.: T. Voorhees, Supt. Troy, N. Y.
J. L. Corey, M. M. Green Island, N. Y.
Chr. Körner, M. C. B. Green Island, N. Y.
Pa. Div.: R. Manville, Supt. & Pur. Agt. and
S. H. Dotterer, M. M. Carbondale, Pa.
T. Orchard, M. C. B. Carbondale, Pa.
Denver Circle R. R. 3 g. 6 m. 3 lo. 15 cars.
Theo. C. Henry, Gen. Man. Denver, Col.
J. H. Bedson, Gen. Supt. Denver, Col.
Denver, Utah & Pacific R. R. 3 g. 34 m. 2 lo. 58 c.
L. M. Fouts, Supt. Denver, Col.
Denver & New Orleans. 4-8½ g. 140 m. 11 lo. 400 c.
C. W. Fisher, Gen. Man. Denver, Col.
Chas. Wheeler, Pur. Agt. Denver, Col.
J. H. Kirk, M. M. & M. C. B. Denver, Col.
Denver & Rio Grande Ry. 3 g. 1,665 m. 222 lo. 5,932 c.
D. C. Dodge, Gen. Man. Denver, Col.
C. M. Hobbs, Pur. Agt. Denver, Col.
N. W. Sample, Supt. M. P. & M. Denver, Col.
(1) Col & N. M. Div.: R. E. Ricker, G. S. Denver, Col.
1st Div.: W. W. Borst, Supt. S. Pueblo, Col.
2d Div.: Cole Lydon, Supt. Alamosa, Col.
3d Div.: G. W. Cook, Supt. Leadville, Col.
4th Div.: R. M. Ridgway, Supt. Salida, Col.
(2) Utah Div.: W. H. Bancroft, G. S. S. Lake City, Utah.
Des Moines, Osceola & Southern R. R.
3 g. 100 m. 7 lo. 253 cars.
Henry Stivers, Gen. Supt. Osceola, Ia.
L. D. Berry, M. M. Osceola, Ia.
Elias Tonet, M. C. B. Osceola, Ia.
Des Moines & Ft. Dodge. 4-8½ g. 144 m. 13 lo. 350 c.
C. N. Gilmore, Supt. Des Moines, Ia.
John McGrayel, M. M. Grand Junction, Ia.
E. A. Avery, M. C. B. Grand Junction, Ia.
Det., Gr. H. & Mil. Ry. 4-8½ g. 189 m. 39 lo. 696 c.
G. R. Nash, Gen. Man. Detroit, Mich.
John S. Lorimer, Storekeeper. Detroit, Mich.
W. J. Morgan, Supt. Detroit, Mich.
H. Roberts, Mech. Supt. Ft. Gratiot, Mich.
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c
John B. Mulliken, Gen. Man. Detroit, Mich.
Allan Bourn, Pur. Agt. Detroit, Mich.
Thos. M. Fish, Gen. Supt. Ionia, Mich.
G. C. Watrous, M. M. & C. B. Ionia, Mich.
Det., Mack. & Marq. R.R. 4-8½ g. 152 m. 16 lo. 1,112 c.
D. McCool, Gen. Supt. Marquette, Mich.
E. W. Allen, Pur. Agt. Marquette, Mich.
John Wilson, Mech. Supt. Marquette, Mich.
Dorchester & Delaware R.R. (See Penna. (4) Del. Div.)
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, Supt. Waverly, Ia.
W. S. Couch, Pur. Agt. Dubuque, Ia.
Duck River Valley R. R. (See Nash., Chat. & St. L.)
Dunkirk, Allegheny Valley & Pittsburgh R. R.
4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, Gen. Supt. Dunkirk, N. Y.
R. C. Moore, Pur. Agt. New York, N. Y.
J. C. Haggett, M. M. & C. B. Dunkirk, N. Y.

E

East Alabama Ry. 5 g. 22 m. 3 lo. 19 cars.
W. W. Barnes, Supt. Opelika, Ala.
East Broad Top R. R. 3 g. 30 m. 7 lo. 260 cars.
A. W. Sims, Supt. Orbisonia, Pa.
A. W. Greenwood, M. M. Orbisonia, Pa.
East St Louis & Carondelet Ry. 4-9 g. 4 lo. 27 c.
Joseph Hill, Gen. Supt. East St. Louis, Ill.
East Tenn. & Western North Car. R. R.
3 g. 34 m. 2 lo. 70 cars.
Thomas E. Matson, Supt. Elizabethton, Tenn.
East Tennessee, Virginia & Georgia R. R.
5 g. 1,453 m. 173 lo. 3,670 cars.
Henry Fink, V. P. & Gen. Man. Knoxville, Tenn.
J. F. O'Brien, Gen. Supt. Knoxville, Tenn.
J. E. Wilcox, Pur. Agt. Knoxville, Tenn.
East Tenn. Div. and No. Car. and Ohio Branches:
F. K. Huger, Supt. Knoxville, Tenn.
B. J. Sitton, M. M. Knoxville, Tenn.
Jos. Armbruster, M. C. B. Knoxville, Tenn.
Alabama Div.: J. M. Bridges, Supt. Selma, Ala.
Simon Gay, M. M. Selma, Ala.
W. W. Pierce, M. C. B. Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, Jr., Supt. Memphis, Tenn.
H. N. Burford, M. M. Memphis, Tenn.
Atlanta Div.: J. W. Fry, Supt. Atlanta, Ga.
M. J. Rogers, M. M. & M. C. B. Atlanta, Ga
Brunswick Div.: J. E. Mallory, Supt. Macon, Ga.
East & West R. R. of Ala. 3 g. 100 m. 6 lo. 75 c.
John Postell, Manager. Cross Plain, Ala.
C. E. Scruton, M. M. & C. B. Cedartown, Ga.
Eastern R. R. 4-8½ g. 283 m. 99 lo. 2,268 cars.
Payson Tucker, Gen. Man. Boston, Mass.
D. W. Sanborn, Mast. of Trans. Boston, Mass.
G. F. Hurd, Pur. Agt. Boston, Mass.
Amos Pillsbury, S. M. P. & M. E. Boston, Mass.
J. D. Billings, G. For. Car Dept. Salem, Mass.
Con'y Div.: J. W. Sanborn, Supt. Wolfboro J., N. H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 160 c.
H. W. Bates, Man. & Pur. Agt. Riverton, Ky.
H. W. Crawford, M. M. Hunnewell, Ky.
Eastern (Maine) R. R. (See Maine Central.)
Eastern Shore R. R. 4-8½ g. 38 m. 3 lo. 9 c.
W. Thompson, Supt. Princess Anne, Md.
F. Strattner, M. M. Princess Anne, Md.
Elberton Air-Line R.R. (See Rich. & Dan. N. G. Brs.)
Elizabeth City & Norfolk R. R. (See Norfolk So.)
Elizabethtown, Lex. & Big Sandy R.R. (See Ches. & O.)
Emmitsburg R. R. (See Western Md.)
Erie & Pittsburg R. R. (See Penna. Co.; (3) Div.)
Eureka Springs Ry. 4-8½ g. 19 m. 1 lo. 9 cars.
Powell Clayton, Gen. Man. Eureka Springs, Ark.
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 125 cars.
B. Gilman, Gen. Supt. & Pur. Agt. Eureka, Nev.
J. M. Crawford, M. M. Palisade, Nev.
A. S. Longley, M. C. B. Palisade, Nev.
European & North American R. R. (See Maine Cen.)
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c.
H. L. Shepard, Supt. Evansville, Ind.
Evansv. & Terre Haute. 4-8½ g. 169 m. 26 lo. 973 c.
D. J. Mackey, Gen. Supt. Evansville, Ind.
John Torrance, M. M. Evansville, Ind.

F

Fernandina & Jacksonville R.R. (See Fla., Tr. & P.)
Fitchburg R. R. 4-8½ g. 152 m. [illegible]0 lo. 3,430 cars.
John Adams, Gen. Supt. Boston, Mass.
F. S. Pratt, Pur. Agt. Boston, Mass.
G. A. Coolidge, Supt. M. P. Boston, Mass.
W. A. Foster, Asst. Supt. M. P. Fitchburg, Mass.
J. W. Marden, M. C. B. Charlestown, Mass.
Flint & Pere Marq. 4-8½ g. 346 m. 72 lo. 2,100 cars.
H. C. Potter, Gen. Man. E. Saginaw, Mich.
D. Edwards, Asst. Gen. Man. E. Saginaw, Mich.
G. G. Cook, Pur. Agt. E. Saginaw, Mich.
Sanford Keeler, Gen. Supt. E. Saginaw, Mich.
W. F. Potter, Supt. (E. Div.) E. Saginaw, Mich.
M. V. Meredith, Supt. (W. Div.) E. Saginaw, Mich.
T. J. Hatswell, M. M. E. Saginaw, Mich.
R. McPherson, M. C. B. E. Saginaw, Mich.
Florida Central & Western R. R.
5 g. 234 m. 16 lo. 193 cars.
D. E. Maxwell, Gen. Supt. Jacksonville, Fla.
J. S. McElroy, Mast. Tr. & Mach. Tallahassee, Fla.
Florida Southern Ry. 3 g. 91 m. 6 lo. 96 cars.
Sherman Conant, Gen. Man. Palatka, Fla.
Jas. D. Hollister, Supt. Palatka, Fla.
Florida Transit R. R. 5 g. 254 m. 15 lo. 204 c.
D. E. Maxwell, Gen. Supt. Fernandina, Fla.
John Hedges, Pur. Agt. Fernandina, Fla.
R. V. Dahoney, M. M. Fernandina, Fla.
G. Hernandez, M. C. B. Fernandina, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo. 25 c.
Lawton Caten, Supt. Gloversville, N. Y.
G. V. Putman, M. M. Gloversville, N. Y.
Fond du Lac, Amboy & Peoria. 3 g. 30 m. 2 lo. 35 c.
Alonzo Kinyon, Supt. & P. A. Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. (See Minn. & St. L.)
Franklin & Prov. & Hopkinton. 22 m.
E. T. Logee, Supt. Milford, Mass.
Ft. Madison & No.-West'n Ry. 3 g. 45 m. 5 lo. 127 c.
S. B. Kenrick, Supt. & Pur. Agt. Ft. Madison, Ia
I. L. Lamb, M. M. & C. B. Ft. Madison, Ia.
Ft. Wayne, Cin. & Louisv. 4-8½ g. 128 m. 10 lo. 250 c.
White Water R. R. 4-8½ g. 65 m. 5 lo. 170 cars.
W. W. Worthington, Gen. Supt. Ft. Wayne, Ind.
T. H. Haberkorn, M. M. Ft. Wayne, Ind.
Wm. Knight, M. C. B. Ft. Wayne, Ind.
Fort Worth & Denver City Ry.
4-8½ g. 114 m. 8 lo. 443 cars.
C. L. Frost, Gen. Supt. Fort Worth, Tex.
Freehold & New York Ry. 4-8½ g. 15 m. 4 lo. 40 c.
J. E. Ralph, Supt. & Pur. Agt. Keyport, N. J.
M. C. Mooney, M. M. Freehold, N. J.
C. H. Snedeker, M. C. B. Freehold, N. J.
Fulton County N. G. Ry. 3 g. 61 m. 4 lo. 168 cars.
A. C. Atherton, Gen. Supt. & P. Agt. Lewiston, Ill.

G

Gainesville & Dahlonega R. R. 3 g. 15 m.
W. P. Price, Pres. Dahlonega, Ga.
Gainesville, Jefferson & Southern R.R. (See Cen. of Ga)
Gal., Harrisburg & San Antonio Ry. (See Cen. Pac.)
Galveston, Houston & Hend. R.R. (See Mo. Pac. (5) Div.)
Galveston, Sabine & St. Louis Ry.
4-8½ g. 15 m. 2 lo. 27 cars.
Brad. Barner, Gen. Man. Longview, Tex.
Chas. H. Jewell, Gen. Supt. Longview, Tex.
Geneva, Ithaca & Sayre R. R. (See Lehigh Val.)
George's Creek & Cumberland R. R.
4-9 g. 25 m. 6 lo. 212 cars.
J. A. Millholland, Gen. Man. Cumberland, Md.
Georgetown & Lane's R. R. 5 g. 36 m. 2 lo. 52 c.
G. W. Earle, Gen. Supt. Georgetown, S. C.
Georgia R. R. 5 g. 307 m. 42 lo. 1,017 cars.
John W. Green, Gen. Man. Augusta, Ga.
John S. Cook, M. M. Augusta, Ga.
T. M. Preval, M. C. B. Augusta, Ga.
Georgia Pacific Ry. 5 g. 218 m.
I. Y. Sage, Supt. Birmingham, Ala.
W. M. Sutton, Pur. Agt. Greenville, Miss.
Benj. Davis, M. M. Greenville, Miss.
J. B. Shelton, M. C. B. Greenville, Miss.
Grand Haven R. R. (See Chic. & W. Mich.)
Grand Junction Ry. (See Midland of Can.)
Grand Rapids, Indiana & Mackinaw. (See Gr. R. & I.)
G'd Rap., Newaygo & L. S. R. R. (See Chic. & W. M.)
Grand Rapids & Indiana. 4-8½ g. 528 m. 52 lo. 1,724 c.
W. O. Hughart, Gen. Man. Grand Rapids, Mich.
W. R. Shelby, Pur. Agt. Grand Rapids, Mich.
S. D. Bradley, M. M. Grand Rapids, Mich.
No'n Div.: J. M. Metheany, Supt. G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, Supt. Fort Wayne, Ind.
Grand Southern Ry. of New Brunswick.
4-8½ g. 82 m. 5 lo. 54 cars.
J. N. Greene, Gen. Man. St. George, N. B.
F. W. Holt, Supt. St. George, N. B.
Thomas Logan, M. M. St. George, N. B.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
T. M. Williamson, Supt. & P. A. Gr. Tower, Ill.
Hugh Smith, M. M. & C. B. Grand Tower, Ill.
Grand Trunk Ry. 4-8½ g. 2,332 m. 660 lo. 16,330 c.
Joseph Hickson, Gen. Man. Montreal, Can.
Wm. Wainright, Asst. Man. Montreal, Can.
Mont. Divs.: W. J. Spicer, Supt. Montreal, Can.
Jno. Taylor, Gen. Storekeeper. Montreal, Can.
Herbert Wallis, Mech. Supt. Montreal, Can.
Wm. McWood, Supt. Car Dept. Montreal, Can.
J. Haskoni, Div. M. S. Richmond, P. Q.
Tor. Div.: E. Wragge, Asst. Gen. Man. Toronto, Can.
F. L. Wanklyn, Div. M. S. Brockville, Ont.
J. Davis Barnett, Div. M. S. Stratford, Ont.
Gt. West'n Div.: Chas. Stiff, Supt. Hamilton, Ont.
E. Baines, Store Kpr. London, Ont.
C. K. Domville, Mech. Supt. Hamilton, Ont.
C. F. Hanson, Lo. For. London, Ont.
J. D. McIlwain, Supt. Car Dept. London, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 339 m. 103 lo. 1,191 c.
S. R. Callaway, Gen. Man. Chicago, Ill.
W. H. Pettibone, Supt. Battle Creek, Mich.
A. Judd, Pur. Agt. Fort Gratiot, Mich.
H. Roberts, Mech. Supt. Port Huron, Mich.
Grand Trunk, Georgian Bay & Lake Erie Ry. (See G. T.)
Great Western Ry. (See Grand Trunk; G. W. Div.)
Green Bay, Winona & St Paul R. R.
4-8½ g. 250 m. 19 lo. 623 cars.
Timothy Case, Gen. Man. & P. A. Green Bay, Wis.
A. Fenwick, M. M. Ft. Howard, Wis.
Green Cove Spring & Melrose R.R. 3 g. 32 m. 1 lo. 11 c.
S. Ackley, Pres. Philadelphia, Pa.
Greenwich & Johnsonville Ry. 4-8½ g. 15 m. 1 lo. 7 c.
J. H. Thompson, Supt. Greenwich, N. Y.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 536 m. 43 lo. 1,400 c.
Webster Snyder, Gen. Man. Galveston, Texas.
F. P. Killeen, Sec. Galveston, Texas.
Jno. W. Thorne, Pur. Agt. Galveston, Texas.
G. B. Nichols, M. M. C. B. Galveston, Texas.
Gulf, W'n Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 74 c.
M. D. Monserrate, Supt. & Pur. Agt. Cuero, Tex.
James Mooney, M. M. Cuero, Texas.

H

Hannibal & St. Jo. R. R. 4-8½ g. 292 m. 76 lo. 1,906 c.
F. J. Potter, Gen. Man. Chicago, Ill.
T. L. Dunn, Gen. Supt. Hannibal, Mo.
Wm. Irving, Pur. Agt. Hannibal, Mo.
Jas. Long, Supt. M. P. & Car Dep. Hannibal, Mo.
Chas. Coller, For. Car Dept. Hannibal, Mo.
Hanover Branch R. R. 4-8½ g. 8 m. 2 lo. 18 cars.
E. Y. Perry, Supt. South Hanover, Mass.
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 10 lo. 140 cars.
H. D. Scott, Gen. Supt. Gettysburg, Pa.
John J. Bingley, M. M. Hanover, Pa.
Jas. Harthorn, M. C. B. Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 35 m. 3 lo. 35 c.
R. H. Middleton, Supt. Boiling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 47 m. 9 lo. 196 c.
O. M. Shepard, Asst. Supt. New Haven, Ct.
John Henry, Jr., M. M. Hartford, Conn.
Hartford & Conn. W'n R.R. 4-8½ g. 110 m. 16 lo. 495 c.
John F. Jones, Supt. Hartford, Ct.
J. C. Barton, M. M. Hartford, Ct.
Hartwell R. R. (See Rich. & Dan.; N. G. Brs.)
Hecla & Torch Lake R. R. 4-1 g. 5 m. 5 lo. 165 cars.
W. A. Childs, Gen. Man. Calumet, Mich.
Herkimer, Newport & Poland Ry.
3-6 g. 17 m. 2 lo. 24 cars.
Albert Wilber, Supt. Herkimer, N. Y.
Hobart & Manistee River R. R. 3 g. 9 m. 2 lo. 42 c.
H. W. Marsh, Supt. Hobart, Mich.
Hot Springs R. R. 3 g. 25 m. 3 lo. 37 cars.
J. S. Conger, Supt. Hot Springs, Ark.
L. Finlay, M. M. Malvern, Ark.
Housatonic R. R. 4-8½ g. 126 m. 25 lo. 571 cars.
W. H. Yeomans, Supt. Bridgeport, Ct.
D. S. Draper, Pur. Agt. Bridgeport, Ct.
N. Slingland, M. M. Falls Village, Ct.
J. J. Ferris, M. C. B. Falls Village, Ct.
Houston Belt Ry. 4-8½ and 3 gauge 16 miles.
S. L. Werden, V. P. & Gen. Man. Houston, Tex.
Houston, East & West Tex. Ry. 3 g. 150 m. 10 lo. 570 c.
Paul Bremond, Pr. & Pur. Agt. Houston, Tex.
E. L. Bremond, Gen. Man. Houston, Tex.
B. O. Diffey, M. M. Houston, Tex.
C. F. Schelewa, M. C. B. Houston, Texas.
Houston & Tex. Cen. Ry. 4-8½ g. 750 m. 78 lo. 2,526 c.
J. Waldo, V. Pr. & Gen. Man. Houston, Tex.
A. H. Swanson, Gen. Tr. Man. Houston, Tex.
E. S. Larchar, Pur. Agt. New York, N. Y.
L. C. Noble, Gen. M. M. Houston, Tex.
James McGee, M. C. B. Houston, Tex.
So. & Wn. Divs.: M. G. Howe, Supt. Houston, Tex.
No. & Ml. Divs.: G. A. Quinlan, Supt., and
C. H. Burns, Asst. M. M. Corsicana, Tex.
No.-Wn. Div.: Donald Allen, Supt. Waco, Tex.
Humeston & Shenandoah R. R.
4-8½ g. 113 m. 18 lo. 80 cars.
F. O. Wyatt, Gen. Man. Clarinda, Ia.
C. H. Warren, Supt. Clarinda, Ia.
W. B. Snyder, M. M. Shenandoah, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 62 m. 18 lo. 69 c.
Geo. F. Gage, Gen. Supt. Huntingdon, Pa.
Samuel B. Knight, Pur. Agt. Philadelphia, Pa.
William Barkla, M. M. Saxton, Pa.

I

Illinois Central R. R. 4-8½ g. 1,928 m. 334 lo. 8,565 c.
E. T. Jeffery, Gen. Supt. Chicago, Ill.
O. Ott, Pur. Agt. Chicago, Ill.
Henry Schlacks, Supt. of Mach. Chicago, Ill.
W. B. Snow, M. M. Car Works. Chicago, Ill.
(1) Ill. & Ia. Divs.: C. A. Beck, Supt. Chicago, Ill.
Chic. Div.: T. J. Hudson, Supt. Cairo, Ill.
Wm. Renshaw, M. M. Chicago, Ill.
Mid. Div.: H. L. Frisbie, Supt. Pontiac, Ill.
Spring. Div.: W. Wilkinson, Supt. Springfield, Ill.
W. B. McKenna, M. M. Clinton, Ill.
No'n Div.: J. C. Jacobs, Supt. Amboy, Ill.
J. B. Edams, M. M. Amboy, Ill.
Ia. Div.: M. Gilleas, Supt. Dubuque, Ia.
Thos. W. Place, M. M. Waterloo, Ia.
(2) So. Divs.: C. M. Sheafe, Supt. New Orleans, La.
Geo. W. Baxter, M. C. B. McComb City, Miss.
So. Div.: J. M. Turner, Supt. do.
E. D. Anderson, M. M. McComb City, Miss.
Miss. Div.: J. G. Mann, Supt. Jackson, Tenn.
J. F. White, M. M. Water Valley, Miss.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, Rec. & Gen. Man. Decatur, Ill.
O. E. Grady, Train Mast. Decatur, Ill.
Frank Young, For. Shops. Paris, Ill.
Illinois & St. Louis R. R. 4-8½ g. 19 m. 10 lo. 450 c.
C. H. Sharman, Gen. Supt. & P. A. St. Louis, Mo.
D. J. Timlin, M. M. Belleville, Ill.
Charles Rothe, M. C. B. E. St. Louis, Ill.
Indiana, Bloomington & Western Ry.
4-8¾ g. 826 m. 112 lo. 4,067 cars.
C. E. Henderson, Gen. Man. Indianapolis, Ind.
I. H. Wilson, Gen. Supt. Indianapolis, Ind.
H. C. Norton, Pur. Agt. Indianapolis, Ind.
Jos. S. Porter, M. M. Sandusky, O.
B. Warren, Gen. M. M. Indianapolis, Ind.
Peoria Div.: E. Hiserodt, M. M. Urbana, Ill.
St. Louis Div.: John King, M. M. Indianapolis, Ind.
Ohio So. Rd.: W. H. Van Tassall, S. Springfield, O.
A. J. Sanborn, M. M. Springfield, O.
Indiana, Illinois & Iowa R.R. 4-8½ g. 104 m. 5 lo. 83 c.
F. M. Drake, Gen. Man. Kankakee, Ill.
T. P. Shonts, Gen. Supt. Kankakee, Ill.
T. W. Newell, M. M. Kankakee, Ill.
Indiana & Illinois Southern Ry. 3 g. 91 m. 3 lo. 69 c.
W. C. Lyon, Gen. Man. & P. Agt. Robinson, Ill.
J. S. Pickering, M. M. & C. B. Effingham, Ill.
Indianapolis, Decatur & Springfield Ry.
(See Ind., Bloom. & West'n.)
Indianapolis & St. Louis R. R. (See C., C., C. & I.)
Indianapo. & Vincennes R. R. (See Penna. Co.; (8) Div.)
Intercolonial Ry. 4-8½ g. 846 m. 135 lo. 4,500 cars.
David Pottinger, Chief Supt. Moncton, N. B.
T. V. Cook, Gen. Storekeeper. Moncton, N. B.
H. A. Whitney, Mech. Supt. Moncton, N. B.
Ewd. D. Shaffer, M. C. B. Moncton, N. B.
M. & C. Div.: J. E. Price, Supt. Cambellton, N. B.
Hal. & St. J. Div.: J. J. Wallace, Supt. Truro, N. P
Q. & St. F. Div.: A. McDonald, Supt. Riv. du Loup, Q.
International Ry. 4-8½ g. 69 m. 7 lo. 12 cars.
D. E. McFee, Supt. Sherbrooke, Que.
J. Ruelle, M. M. Sherbrooke, Que.
W. Charest, M. C. B. Sherbrooke, Que.
International & Gt. N'n R. R. (See Mo. Pac.; (5) Div.)
Iowa Falls & Sioux City R. R. (See Ill. Cen.)
Iron Ry. (See Tol., Cin. & St. L.)
Iron Mountain & Helena R. R. (See Mo. Pac.; (4) Div.)
Ithaca Auburn & Western Ry. (See Southern Cen.)

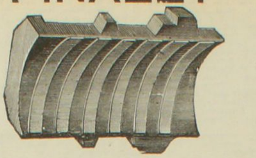
J

Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 69 c.
E. S. Greenleaf, Supt. Jacksonville, Ill.
Ira F. Petrie, M. M. Jacksonville, Ill.
Jacksonville, St. Augustine & Halifax River Ry.
3 g. 76 m. 3 lo. 27 cars.
W. L. Crawford, Gen. Man. Jacksonville, Fla.
H. S. Ming, Supt. Jacksonville, Fla.
Jacksonv., Pensacola & Mob. (See Fla. Cent. & W.)
Jamesville & Washington R. R. (See Norfolk So'n.)
Jeffersonv'l, Madison & Indpls. R. R. (See (9) Pa. Co.)
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, Manager. Jersey City, N. J.
Jersey City & Bergen R. R. 4-8½ g. 6 m. 2 lo. 13 c.
T. M. Sayre, Gen. Supt. Jersey City, N. J.
Jersey Shore, Pine Creek & Buff. Ry. (See Phil. & R.)
Junction & Breakwater R.R. (See Del., Md. & Va.

K

Kaaterskill R. R. 3 g. 8 m.
J. H. Jones, Supt. Rondout, N. Y.
Kankakee & Seneca R.R. (See Cin., Ind., St. L. & Chi.)
Kansas Central R. R. (See Union Pacific.)
Kansas City, Fort Scott & Gulf R. R.
4-8½ g. 389 m. 75 l. 2,037 c.
Geo. H. Nettleton, Gen. Man. Kansas City, Mo.
L. W. Towne, Supt. Kansas City, Mo.
H. P. Jacques, Pur. Agt. Kansas City, Mo.
J. S. McCrum, M. M. Kansas City, Mo.
A. N. Montier, M. C. B. Kansas City, Mo.
Kansas Cy, Lawrence & So. Kan. (See At., Top. & S. F.)
Kansas City, Springfield & Memphis R. R.
4-8½ g. 283 m. 10 lo. 456 cars.
George H. Nettleton, Pres. Kansas City, Mo.
L. W. Towne, Supt. Kansas City, Mo.
H. P. Jacques, Pur. Agt. Kansas City, Mo.
J. S. McCrum, M. M. Kansas City, Mo.
A. H. Montier, M. C. B. Kansas City, Mo.
Kansas City, St. Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ & 3 g. 368 m. 41 lo. 1,148 c.
J. F. Barnard, Gen. Supt. & P. A. St. Joseph, Mo.
Wm. Irving, Pur. Agt. Chicago, Ill.
F. A. Chase, M. M. St. Joseph, Mo.
Thos. Aylesbury, G. For. Car. Dep. St. Joseph, Mo.
Kansas City & Southern Ry. 4-8½ g. In progress.
Wm. Bailey, Pres. Kansas City, Mo.
Kansas Coal Belt R. R. 4-8½ g. In progress.
C. H. Malin, Gen. Man. Girard, Kan.
F. A. Hill, Supt. Girard, Kan.
Kansas & Gulf Short Line R. R. 33 m. 2 lo. 32 cars.
Eli Culverhouse, Gen. Man. Tyler, Tex.
V. K. Stevenson, Pur. Agt. New York, N. Y.
Kendall & Eldred R. R. (See Buf., N. Y. & Phil.)
Kent Northern Ry. 4-8½ g. 27 m. 2 lo. 16 cars.
J. C. Brown, Gen. Man. Richibucto, N. B.
Kentucky Central R. R. 4-9 g. 184 m. 22 lo. 640 cars.
G. W. Bender, Supt. Covington, Ky.
A. H. Watts, M. of Mach. Covington, Ky.
M. C. B. Covington, Ky.
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c.
Geo. B. Harper, Supt. & P. A. Mt. Sterling, Ky.
S. P. Hatfield, M. M. Mt. Sterling, Ky.
Keokuk & Des Moines R.R. (See Chi., R. I. & Pac.)
Kinzua R. R. (See Buf., N. Y. & Phil.)
Kingston & Pembroke Ry. 4-8½ g. 90 m. 9 lo. 214 c.
B. W. Folger, Supt. Kingston, Ont.
J. H. Taylor, Pur. Agt. Kingston, Ont.
J. H. Taylor, M. M. Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 5 lo. 103 cars.
C. A. Coombs, Supt. Bath, Me.
Wm. A. Field, M. M. Bath, Me.
C. L. Turner, M. C. B. Bath, Me.

LE ROY FINALLY VICTORIOUS.



It is falsely pretended that our invention infringes an alleged patent held by Mr. Hopkins. We hereby offer **$2,500** *to Mr. Hopkins if he will commence and prosecute in good faith an action against us to settle the point; and, as we believe he has no valid patent, we stand ready to manufacture and sell his brasses in order that he may sue us. See Babbitt Patent, Sept. 4, 1840, and Joseph Gordnan, March 12, 1861. GEORGE W. McLEAN, President.*

The following is the FINAL decision of the Patent Office in the matter of the Interference of HOPKINS vs. LE ROY, rendered August 31, 1883.

"COPY."

Department of the Interior, United States Patent Office,
Washington, D. C., Sept. 1, 1883.

"In the matter of the interference of HOPKINS vs. LE ROY. } On Appeal to the Commissioner.

"For a Journal Box composed of Hard and Soft Metal, the **SOFT METAL BANDS PROJECTING ON THE JOURNAL BEARING SIDE BEYOND THE SURFACE OF THE HARD METAL**, Priority of Invention Must be Awarded to LE ROY."

By direction of the Commissioner.
Very respectfully,
(Signed) SCHUYLER DINGEE, Chief Clerk.

To T. V. LE ROY, Care John R. Bennett, No. 237 Broadway.
George Harding, Counsel.

Thus reversing all former decisions made in favor of HOPKINS, dissolving the interference heretofore declared in his favor, and sustaining the validity of the LE ROY Patent and every claim made by LE ROY for his Invention.

LE ROY JOURNAL BEARING CO.,

145 Broadway, New York City. GEO. W. McLEAN, President.

Improved Wood-Working Machinery

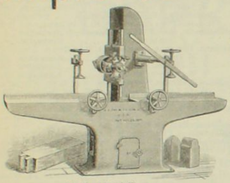
FOR

Railroad, Car and Bridge Shops, Government Arsenals and Navy Yards,

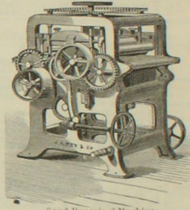
EMBRACING MACHINES FOR

SILL AND TIMBER DRESSING,
PLANING, MATCHING AND BEADING,
MOLDING AND SHAPING,
MORTISING AND BORING,
CAR GAINING,
CAR BORING, ETC., ETC.,

BAND AND SCROLL SAWING,
CIRCULAR AND BAND RESAWING,
SELF-FEEDING RIPPING & CROSS-CUTTING,
ROTARY CAR MORTISING AND BORING,
SAND PAPERING,
CAR TENONING, ETC., ETC.



Vertical End Tenoner.

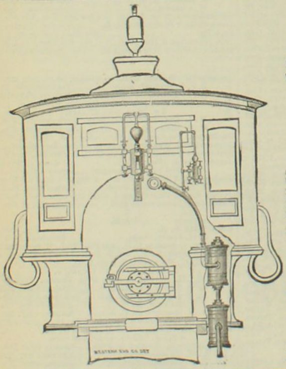


Sand-Papering Machine.

Illustrations and Estimates furnished upon application to

W. H. DOANE, President
D. L. LYON, Secretary.

J. A. FAY & CO., Cincinnati, Ohio, U. S. A.



THE DETROIT LUBRICATOR COMPANY'S

SIGHT FEED LUBRICATORS,

For Locomotive Cylinders and Air-Pumps.

The attention of railroad men is invited to the Detroit Lubricator Co.'s Patent Sight Feed Lubricators, for oiling locomotive valves and cylinders, and the Westinghouse Air Pump. Both cups are placed within the cab. The valve cup has a double sight feed, each of which is connected to the right and left hand steam chests, by means of the so-called "tallow pipes," running beneath the jacket, thus securing *independent lubrication to each steam chest and cylinder from the one cup.* The oil is shown passing in drops through each sight feed glass to the parts to be lubricated, and can be regulated to feed fast or slow. *The feed is regular and continuous, going up or down grade, whether pressure is on or off,* thus securing perfect lubrication at all times. What is said in reference to the valve cup, is equally true in regard to our lubricator for the Westinghouse Pump. By the use of these cups, the saving in wear and tear of machinery and the additional power gained is simply wonderful, as is proved by actual results.*

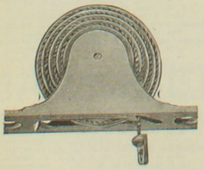
We solicit a practical test, and will send one or more valve and air-brake cups to responsible parties on 30 days' trial. Details and drawings showing manner of attachment and prices furnished on application.

DETROIT LUBRICATOR CO.

Office: 129 GRISWOLD ST., - - - DETROIT, MICH.

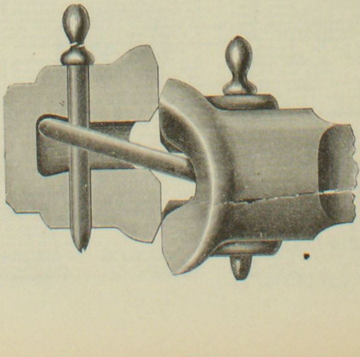
* Numerous examples can be furnished where engines have run *two years and over, without having had their valves faced.* The average mileage for the air-brake lubricator is 500 to 1,500 miles to the ½ pint, and examples can be given where this mileage has been greatly exceeded, among which is one of 1,612 *miles with a ½ pint* of oil on a daily run of 208 miles with 64 stops. This pump has run *nine months without having had 25 cents expended on it for repairs.*

"CAR WINDOW BALANCE."



For Passenger Coaches, Sleeping and Parlor Car Windows, consisting of Cone and Coil Spring with wire cord, balancing the weight of sash; noiseless in operation and placed entirely out of sight. Adopted by many of the leading roads. No car complete without them.

O. K. GARDNER, Manufacturer,
28 and Railroad Sts., Pittsburgh, Pa.



SAFFORD'S SAFETY DRAW-BAR.

"VICTORY OVER MORE THAN 30 CONTESTANTS."

Victory over more than 30 Self-Couplers in the Master Car-Builder's Convention of June, 1876. Also indorsement for safety in coupling by the Yard Masters, in their Convention, June, 1877, and by 300 others who were unable to attend the Convention, and 300 railroad officials who are resident in 26 States, and who admitted superiority over any other yet produced. Try 30 free of royalty, and see for yourself! Pattern free, and no change in timbers or connections. Those made by Wilson, Walker & Co., Pittsburgh, Pa., *will save 200 per cent. in repairs,* and give double life service over *old styles of* wrought iron. About 43,000 in use by 146 railroads. The *saving in repairs* by using *my invention* is from 20 per cent. to 80 per cent. as per *report of many officers.*

J. B. SAFFORD,

EAGLE IRON WORKS

BUFFALO, N. Y.

Knoxville & Augusta R. R. 5 g. 16 m. 2 lo. 34 cars.
R. N. Hood, Gen. Man. & P. Agt. Knoxville, Tenn.
J. M. Hood, Supt. Knoxville, Tenn

L

Lackawanna & Pittsburg R. R. 3 g. 101 m.
R. M. Patterson, Gen. Supt. Friendship, N. Y.
Lake Champlain & Moriah R. R. 4-8½ g. 8 m. 8 lo. 222c.
E. B. Hedding, Supt. Port Henry, N. Y.
Lake Erie & Western Ry. 4-8½ g. 388 m. 53 lo. 1,701 c.
J. H. Cheney, Gen. Man. Bloomington, Ill.
D. S. Hill, Gen. Supt. Bloomington, Ill.
T. H. Perry, Pur. Agt. Bloomington, Ill.
H. L. Cooper, Supt. of Equipment. Lima, O.
Lake George & Muskegon River R. R.
4-8½ g. 20 m. 4 lo. 79 cars.
W. S. Gerrish, Gen. Man. Muskegon, Mich.
Lake Shore & Michigan So'n Ry.
4-8½ g. 1,340 m. 547 lo. 17,115 cars.
John Newell, Gen. Man. Cleveland, O.
P. P. Wright, Gen. Supt. Cleveland, O.
A. C. Armstrong, Pur. Agt. Cleveland, O.
G. W. Stevens, Supt. M. P. Cleveland, O.
John Kirby, Gen. M. C. B. Cleveland, O.
East'n Div.: C. B. Couch, Supt. Cleveland, O.
J. S. Graham, M. M. Buffalo, N. Y.
A. C. Robson, M. C. B. Buffalo, N. Y.
L. O. Gassett, M. M. Cleveland, O.
J. Withycombe, M. C. B. Cleveland, O.
Frank. Div.: G. H. McIntire, Supt. Youngstown, O.
Toledo Div.: Thos. Flesher, Jr., Supt. Cleveland, O.
J. M. Sanborn, M. M. Norwalk, O.
W. O. Smith, M. C. B. Norwalk, O.
Mich. Divs.: J. E. Curtis, Supt. Toledo, O.
Det. Brs.: T. J. Charlesworth, Supt. Detroit, Mich.
Lansing, Ypsilanti & Ft. Wayne Branches.
W. H. Caniff, Supt. Hillsdale, Mich.
Western Div.: A. G. Amsden, Supt. Chicago, Ill.
W. L. Gilmore, M. M. Elkhart, Ind.
Frank O. Bray, M. C. B. Adrian, Mich.
Gr. Rap. Br.: M. E. Wattles, Supt. Kalamazoo, Mich.
Lake Tahoe R. R. 3 g. 10 m. 3 lo. 49 cars.
D. L. Bliss, Gen. Man. Carson, Nev.
John T. Rogers, Gen. Supt. Carson, Nev.
Geo. R. Lindsay, M. M. Carson, Nev.
Leavenworth, Topeka & So. W'n Ry. (See A. T. & S. F.)
Lebanon Springs R. R. 4-8½ g. 58 m. 5 lo. 44 c.
W. C. Alstyne, Gen. Man. Albany, N. Y.
W. H. Hawkins, Pur. Agt. Albany, N. Y.
Geo. Tefft, M. M. Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 495 m. 392 lo. 36,998 c.
H. S. Goodwin, Gen. Supt. Bethlehem, Pa.
W. C. Alderson, Pur. Agt. Philadelphia, Pa.
John I. Kinsey, M. M. So. Easton, Pa.
John S. Lentz, M. C. B. Packerton, Pa.
N. J. Div.: Jas. Donnelly, Supt. Perth Amboy, N. J.
Coal Rds.: J. I. Blakeslee, Supt. Mauch Chunk, Pa.
D. Clark, M. M. Hazleton, Pa.
John Campbell, M. M. Delano, Pa.
B. M. Div.: A. G. Brodhead, S. Mauch Chunk, Pa.
P. Hofecker, M. M. Weatherly, Pa.
Wy. Div.: A. Mitchell, S. & M. M. Wilkesbarre, Pa.
Pa. & N. Y.; and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevenson, Gen. Supt. Sayre, Pa.
J. N. Weaver, M. M. Sayre, Pa.
Lehigh & Hudson River Ry. 4-8½ g. 63 m. 8 lo. 350 c.
Grinnell Burt, Gen Man. Warwick, N. Y.
N. L. Furman, Supt. Warwick, N. Y.
John Sayre, Pur. Agt. Warwick, N. Y.
W. L. Anderson, Supt. Warwick, N. Y.
S. Mills, M. M. Warwick, N. Y.
Lehigh & Lackawanna and Lehigh & Susquehanna R. Rs. (See Phil. & Read.; N. J. Cen. Div.)
Levis & Kennebec R. R. (See Quebec Cen.)
Ligonier Valley R. R. 4-9 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, Gen. Manager. Pittsburg, Pa.
Geo. Senft, Supt. & P. Agt. Latrobe, Pa.
Little Miami R. R. (See Penna. Co.'s Rds.; (8) Div.)
Little Rock, Miss. River & Texas Ry.
4-8½ g. 170 m. 12 lo. 299 cars.
H. Wood, Gen. Man. Little Rock, Ark.
F. A. Lister, Gen. Supt. Little Rock, Ark.
F. Hufsmith, M. M. & C. B. Arkansas City, Ark.
Little Rock & Fort Smith. 4-8½ g. 170 m. 13 lo. 360 c.
Hy. Wood, Gen. Man. Little Rock, Ark.
F. A. Lister, Gen. Supt. Little Rock, Ark.
F. Hufsmith, M. M. & M. C. B. Argenta, Ark.
Little Saw Mill Run R. R. 3 & 4-8½ g. 8 m. 4 lo. 327 c.
T. Hartley, Gen. Man. Banksville, Pa.
Long Island R. R. 4-8½ g. 352 m. 92 lo. 953 cars.
I. D. Barton, Gen. Supt. Long Island City, N. Y.
Benj. Norton, Pur. Agt. Long Island City, N. Y.
C. A. Thompson, M. M. & C. B. do.
W. B. Turner, M. M. Hunter's Point, L. I.
O. Fairhurst, M. M. Greenpoint, L. I.
Longview & Sabine Valley R. R. (See Gal. Sab. & St. L.)
Louisiana W'n R. R. (See Cen. Pac.; G., H. & S. A. Div.)
Louisville, Cin. & Lexington R. R. (See Louis. & N.)
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 24 lo. 1,032 c.
Geo. T. Evans, Gen. Man. Louisville, Ky.
W. H. Field, Pur. Agt. Louisville, Ky.
Geo. N. Sceets, M. M. Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 470 miles 56 lo. 3,700 cars.
John MacLeod, Gen. Supt. Louisville, Ky.
H. O. Nourse, Pur. Agt. Louisville, Ky.
Josiah Bettis, M. M. & C. B. New Albany, Ind.
Nor. Div.: W. G. Sala, Supt. Chicago, Ill.
So. Div.: W. N. Marshall, Supt. New Albany, Ind.
Louisville, New Orleans & Tex. Ry. 450 m. In progress.
R. T. Wilson, Dir. 2 Exchange Ct., New York.
Louisville & Nashville R. R.
5 g. 2,186 m. 380 lo. 12,197 cars.
B. Dunham, Gen Man. Louisville, Ky.
J. T. Harahan, Gen. Supt. Louisville, Ky.
W. P. Harris, Supt. Louisville, Ky.
P. P. Huston, Pur. Agt. Louisville, Ky.
Reuben Wells, Supt. Mach. Louisville, Ky.
Louisv., Cin. & Lex. Divs.:
J. G. Metcalf, Supt. Trans. Louisville, Ky.
P. Leeds, M. M. Louisville, Ky.
J. W. Luttrell, M. M. Louisville, Ky.
J. G. Clifford, M. M. (2d & C. Div.) Bowling Grn. Ky.
Henderson Div.: L. Hege, Supt. Henderson, Ky.
W. P. Pike, M. M. Nashville, Tenn.
Nash. & D. Div.: J. Geddes, Supt. Nashville, Tenn.
S. & N. A. Div.: E. Marsh, Supt. Birmingham, Ala.
C. W. White, M. M. Birmingham, Ala.
Mob. & M.: N. Div. Pens. & Sel.; Sl. & Mont. R. Rs.:
M. S. Belknap, Supt. Montgomery, Ala.
J. N. Hall, M. M. (Mont. Shops). Montgomery, Ala.
N. O. Div.: O. M. Dunn, Supt. New Orleans, La.
Wm. Adair, M. M. Mobile, Ala.
Memp. Div.: W. Colcamp, Supt. Memphis, Tenn.
J. V. Slusser, M. M. Memphis, Tenn.
St. L. Div.: C. O. Parker, Supt. Montgomery, Ala.
Thos. Walsh, M. M. Mt. Vernon, Ill.
Pensacola and So. Div. Pens. & Selma Rds.:
E. O. Saltmarsh, Supt. Pensacola, Fla.
W. D. Robb, M. M. Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m. 1 lo. 5 c.
J. H. Wilkins, Supt. & Pur. Agt. Louisville, Ga.

M

Macon & Brunswick R. R.
(See E. Tenn., Vir. & Ga.; At. & Ga. Divs.)
Maine Central R. R. 4-8½ g. 465 m. 59 lo. 1,335 c.
Payson Tucker, Gen. Man. Portland, Me.
Ira K. Russell, M. M. Waterville, Me.
C. H. Kenison, M. C. B. Augusta, Me.
Eastern Maine. 3 g. 19 m. 2 lo. 40 c.
L. L. Lincoln, Supt. Portland, Me.
Manchester & Keene R. R. 4-8½ g. 30 m. (See Concord.)
Manchester & Lawrence R. R. (See Concord.)
Manchester & North Weare R. R. (See Concord.)
Manhattan Ry. 4-8½ g. 32 m. 219 lo. 630 pass. c.
Frank K. Hain, Gen. Man. New York, N. Y.
C. L. Green, Supt. New York, N. Y.
T. W. Peeples, M. M. New York, N. Y.
H. A. Webster, M. C. B. New York, N. Y.
Manhattan, Alma & Burlingame Ry. (See A., T. & S. F.)
Manitoba Southwestern Colonization Ry.
4-8½ g. 52 m. 3 lo. 125 cars.
J. M. Eagan, Gen. Supt. Winnipeg, Man.
Chas. Newell, M. M. Winnipeg, Man.
Marietta & Cincinnati R. R. (See Cin. Wash. & Balt.)
Marietta & North Georgia R. R. 3 g. 60 m. 3 lo. 7 c.
J. B. Glover, Supt. & P. Agt. Marietta, Ga.
E. A. Withers, M. M. Marietta, Ga.

Marquette, Houghton & Ontonagon R. R.
4-8½ g. 100 m. 42 lo. 2,530 cars.
Samuel Schoch, Gen. Man. Marquette, Mich.
M. B. McGee, Pur. Agt. Marquette, Mich.
W. A. Thompson, M. M. Marquette, Mich.
H. D. Lyons, M. C. B. Marquette, Mich.
Maryland Central R. R. 3 g. 27 m. 4 lo. 56 cars.
S. G. Boyd, Supt. Baltimore, Md.
Massachusetts Central R. R. 4-8½ g. 48 m. 5 l. 81 c.
E. G. Allen, Supt. & Pur. Agt. Boston, Mass.
E. A. Walker, M. M. So. Sudbury, Mass.
McComb, Deshler & Toledo R. R.
(See Cin., Ham. & Day.; D. & M. Div.)
Meadville Ry. (See Penna. Co.'s Rds.; (2) Div.)
Memphis & Charleston R. R. (See E. Tenn. Va. & Ga.)
Memphis & Lit. Rock R. R. 5 g. 135 m. 14 lo. 299 c.
E. K. Sibley, G. Man. & P. A. Little Rock, Ark.
H. G. Fleming, Supt. Memphis, Tenn.
Thos. Rennell, M. M. Argenta, Ark.
P. Twitchell, M. C. B. Argenta, Ark.
Mexican Ry. 4-8½ g. 293 m. 42 lo. 616 cars.
E. W. Jackson, Gen. Man. Mexico, Mex.
Mexican Central Ry. 4-8½ g. 680 m. 73 lo. 818 c.
Howard Hinckley, Pur. Agt. Boston, Mass.
Main Line: 309 m.
D. B. Robinson, Gen. Man. City of Mexico.
J. H. Garner, Supt. Trans. City of Mexico.
J. G. McCuen, Gen. M. M. El Paso, Tex.
F. W. Johnstone, M. M. City of Mexico.
J. H. O'Brien, M. C. B. City of Mexico.
Chihuahua Div.: 371 m.
D. B. Robinson, G. Supt. El Paso del Norte, Mex.
Supt. R. S. El Paso del Norte, Mex.
Tampico Div.: 262 m. In progress.
Edward A. Whorf, Supt. Tampico, Mex.
Mexican National Ry. 3 g. 766 m. 50 lo. 1,283 c.
Texas Mexican Ry. 3 g. 171 m. 10 lo. 212 c.
G. C. Gardner, Gen. Man. New York, N. Y.
J. Dougherty, Pur. Agt. New York, N. Y.
Galv. Div. T. M. Ry.: M. Quin, Supt. Galveston, Tex.
No. Div. Mex. Nat. Ry. & So. Div. Tex.-Mex. Ry.
C. A. Merriam, Supt. Laredo, Texas.
Jno. Harding, M. M. & C. B. Corpus Christi, Tex.
So. Div. M. N. Ry.: W. E. Lewis, Supt. Mexico, Mex.
J. M. Winslow, M. M. Mexico, Mex.
Mat. Div.: F. E. Butterfield, Supt. Matamoras, Mex.
Mexican, Oriental, Inter-Oceanic & International R. R. 1,400 miles. In progress.
G. M. Dodge, Pres. 195 B'way, New York, N. Y.
Michigan Cen. R. R. 4-8½ g. 1,485 m. 357 lo. 11,284 c.
H. B. Ledyard, Pres. & Gen. Man. Detroit, Mich.
Allan Bourn, Pur. Agt. Detroit, Mich.
S. H. Edgerly, Gen. M. M. Jackson, Mich.
Robert Miller, Gen. M. C. B. Detroit, Mich.
(1) Lines West of Detroit River:
E. C. Brown, Gen. Supt. Detroit, Mich.
East. Div.: D. S. Sutherland, Supt. Detroit, Mich.
Bay City, Saginaw & Mackinaw Divisions.:
W. A. Vaughan, Supt. Bay City, Mich.
C. E. Smart, M. M. Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hav. Divs.:
C. B. Bush, Supt. Jackson, Mich.
W'n Divs.: R. H. L'Hommedieu, Supt. Chicago, Ill.
(2) Lines East of Detroit River:
Wm. H. Perry, Agt. Buffalo, N. Y.
J. E. Morford, Supt. St. Thomas, Ont.
A. Bull, M. M. St. Thomas, Ont.
Rob't Potts, M. C. B. St. Thomas, Ont.
Michigan & Ohio.
Luther Allen, Supt. Toledo, O.
H. H. Mitchell, Pur. Agt. Toledo, O.
D. J. Durrell, M. M. Marshall, Mich.
Middleburg & Schoharie; and Schoharie Valley R. Rs. 4-8½ g. 11 m. 2 lo. 6 cars.
P. S. Danforth, Gen. Supt. Middleburg, N. Y.
Midland of Canada. 4-8½ g. 452 m. 48 lo. 1,423 c.
Geo. A. Cox, Gen. Man. Peterborough, Ont.
W. B. Ferguson, Gen. Supt. Peterborough, Ont.
C. H. Crofts, Storekeeper. Peterborough, Ont.
J. D. Barnett, Mech. Supt. Port Hope, Ont.
Edward Douglas, M. C. B. Port Hope, Ont.
H. Harry, M. C. B. Lindsay, Ont.
Tor. & Nipissing Div.: J. Haggas, M. M. Uxb'ge, Ont.
Chas. E. Caron, M. C. B. Uxbridge, Ont.
Midland No. Carolina Ry. 5 g. 95 m. 9 lo. 82 cars.
Atlantic & North Carolina Ry. 22 m.
John D. Whitford, Gen. Man. Newbern, N. C.
J. A. Bryan, Supt. Newbern, N. C.
D. J. Sprague, Pur. Agt. New York, N. Y.
B. Manly, Supt. of Mach. Newbern, N. C.
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 370 m. 45 lo. 1,536 cars.
H. G. H. Reed, Gen. Man. & P. Agt. Milwaukee, Wis.
J. Donahue, Supt. Milwaukee, Wis.
David B. Curtis, Asst. Supt. Oshkosh, Wis.
John Hickey, M. M. Ledyard, Wis.
Milwaukee & Northern and Wisconsin & Michigan R. Rds. 4-8½ g. 228 m. 15 l. 703 cars.
C. F. Dutton, Gen. Supt. Milwaukee, Wis.
N. S. Kimball, M. M. Ft. Howard, Wis.
Mineral Range R. R. 3 g. 13 m. 4 lo. 43 cars.
Chas. E. Holland, Pr. & Supt. Hancock, Mich.
W. H. Carr, Pur. Agt. Hancock, Mich.
T. J. Shellhorn, M. M. & C. B. Hancock, Mich.
Minneapolis, Lyndale & Minnetonka Ry.
3 g. 20 miles 4 motors 1 lo. 35 cars.
William McCrory, Man. Minneapolis, Minn.
T. W. Heintzelman, M. M. Minneapolis, Minn.
Mississippi, Terre Aux Boeufs & Lake R. R.
29 miles.
M. R. Spelman, Supt. New Orleans, La.
Mississippi & Tenn. R. R. 4-8½ g. 101 m. 12 lo. 194 c.
M. Burke, Gen. Supt. Memphis, Tenn.
J. C. Ramsey, M. M. Memphis, Tenn.
S. J. Bolton, M. C. B. Memphis, Tenn.
Missouri, Kansas & Texas Ry. (See Mo. Pac.; (2) Div.)
Missouri Pacific Ry. (Leased and operated lines.)
4-8½ g. 6,029 m. 697 lo. 19,748 cars.
A. A. Talmage, Gen. Man. St. Louis, Mo.
R. B. Lyle, Pur. Agt. St. Louis, Mo.
(1), (2) and (3) Divs.:
John Hewitt, Supt. M. P. & M. St. Louis, Mo.
John Hodge, Supt. Car Dep. St. Louis, Mo.
(4), (5) and (6) Divs.:
O. A. Haynes, S. M. P. & M. Marshall, Tex.
(1) Missouri Pacific Ry. 1,028 m. 155 lo. 4,218 cars.
A. M. Hager, Supt. Sedalia, Mo.
Le Roy Bartlett, M. M. St. Louis, Mo.
E. Taylor, M. M. Sedalia, Mo.
W'n Div.: W. W. Fagan, Supt. Atchison, Kan.
(2) Mo., Kan. & Tex. Ry. 1,308 m. 140 lo. 4,248 cars.
S. Irvin, Asst. Supt. Car Dep. Sedalia, Mo.
J. B. Vandyne, Supt. Parsons, Kan.
J. W. Haines, M. M. Parsons, Kan.
(3) Central Branch Un. Pac. R. R. 388 m. 30 lo. 599 c.
W. W. Fagan, Supt. Atchison, Kan.
H. V. Faries, M. M. Atchison, Kan.
J. W. Blackburn, A. Supt. Car D. Atchison, Kan.
(4) St. L., I. Mt. & So'n Ry. 905 m. 138 lo. 4,928 c.
Wm. Kerrigan, Supt. St. Louis, Mo.
St. Louis Div.: W. H. Harris, M. M. De Soto, Mo.
Ark. Div.: J. J. Frey, Asst. Supt. Little Rock, Ark.
R. M. Richardson, M. M. Little Rock, Ark.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Wm. H. Pratt, Trustee. Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars.
W. L. Clark, Gen. Supt. Columbus, Ga.
J. C. Albrecht, M. M. Columbus, Ga.
A. J. Nix, M. C. B. Columbus, Ga.
Mobile & Montgomery Ry. (See Louis. & Nash.)
Mobile & Northwestern R. R. 3 g. 31 m. 2 lo. 16 c.
Thomas T. A. Lyon, Pres. Glendale, Miss.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,353 cars.
G. Jordan, V. Pr. & Gen. Man. Mobile, Ala.
F. Jordan, Pur. Agt. Mobile, Ala.
M. T. Carson, Gen. M. M. Whistler, Ala.
J. T. Booth, M. C. B. Whistler, Ala.
So'n Div.: J. G. Motley, Supt. Mobile, Ala.
John Fitzgerald, M. M. Macon, Miss.
No'n Div.: E. S. Hosford, Supt. Jackson, Tenn.
M. M. Jackson, Tenn.
Mobile & Spring Hill R. R. 5-2 g. 8 m. 1 lo. 16 cars.
F. Ingate, Manager. Mobile, Ala.
Moline & Southeastern R. R. 3-6 g. 8 m. 2 lo. 26 c.
R. Battersly, Gen. Man. Coal Valley, Ill.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 8 cars.
G. B. Wiestling, Supt. & P. A. Mont Alto, Pa.
Montgomery & Eufaula Ry. (See Cen. of Ga.)

Montgomery Southern Ry. 3 g. 20 m. 1 lo. 15 cars.
S. D. Hubbard, Jr., Gen. Man. Montgomery, Ala.
Montour R. R. 4-8½ g. 12 m. 2 lo. 130 cars.
C. R. Brown, Supt. & Pur. Agt. Imperial, Pa.
Henry Newman, M. C. B. Imperial, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 86c.
W. A. Stowell, Supt. Montpelier, Vt.
Montreal, Portland & Boston Ry. (See Passumpsic.)
Montreal & Sorel Ry. 4-8½ g. 47 m. 3 lo. 35 c.
C. N. Armstrong, G. M. & Pur. Agt. Sorel, Que.
J. F. Armstrong, Gen. Supt. Sorel, Que.
G. W. Pangborn, M. M. Sorel, Que.
Montrose Ry. 3 g. 28 m. 3 lo. 24 cars.
T. G. Walter, Gen. Supt. Tunkhannock, Pa.
Morgan's Louis. & Tex. R. R. 4-8½ g. 266 m. 44 l. 885 c.
J. Kruttschnitt, Supt. New Orleans, La.
C. Trumpy, Pur. Agt. New Orleans, La.
N. Tilton, M. M. Algiers, La.
Wm. O'Brien, M. C. B. Algiers, La.
Mount Washington R. R. 5-3 g. 3 m. 6 lo. 6 cars.
Walter Aiken, Gen. Man. Franklin, N. H.
Muncy Creek Ry. (See Wmspt. & No. Br.)

N

Nantasket Beach R. R. 4-8½ g. 6 m. 5 lo. 25 c.
George L. Keyes, Gen. Supt. Boston, Mass.
Naugatuck R. R. 3 g. 4 m. 17 lo. 547 cars.
Geo. W. Beach, Supt. Waterbury, Conn.
H. A. Bishop, Pur. Agt. Bridgeport, Conn.
H'y D. Beach, Supt. R. S. Bridgeport, Conn.
Napanee, Tamworth & Quebec Ry. In progress.
Ed. W. Rathbun, Man. Dir. Deseronto, Ont.
R. C. Carter, Supt. Deseronto, Ont.
Narragansett Pier R. R. 4-8½ g. 8 m. 2 lo. 11 c.
G. T. Lanphear, Supt. & Pur. Agt. Peacedale, R. I.
Nashua & Rochester R. R. (See Wor. & Nash.)
Nashville, Chattanooga & St. Louis Ry.
5 g. 539 miles 87 lo. 1,979 cars.
J. W. Thomas, G. Man. & P. Agt. Nashville, Tenn.
M. J. C. Wrenne, Supt. Nashville, Tenn.
James Cullen, M. M. & C. B. Nashville, Tenn.
Nashville & Florence R. R. 5 g. 20 m.
J. T. Craik, Supt. Columbia, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 100 m. 7 lo. 92 c.
E. D. Frost, Gen. Supt. Natchez, Miss.
National Car Company. 4,000 freight cars.
L. Millis, Pres. Boston, Mass.
F. Stewart Stranahan, Sec. & Tr. St. Albans, Vt.
John B. Fletcher, Supt. St. Albans, Vt.
Nebraska, Topeka, Iola & Memphis R. R. 4-8½ g. 16 m.
H. M. Clarke, Gen. Man. Girard, Kan.
C. H. Malin, Gen. Supt. Girard, Kan.
Nevada Central R. R. (See Union Pac.; (7) Div.)
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, Supt. Grass Valley, Cal.
Jas. McCormick, M. M. & C. B. Grass Valley, Cal.
Nevada & Oregon R. R. 3 g. 30 m. 25 cars.
D. W. Balch, Supt. Reno, Nev.
New Brunswick Ry. 4-8½ g. 419 m. 20 lo. 357 cars.
E. R. Burpee, Gen. Man. Woodstock, N. B.
Jesse Mathews, M. M. Gibson, N. B.
T. N. Burpee, M. C. B. Gibson, N. B.
J. J. Seely, Pur. Agt. Gibson, N. B.
Thos. Armstrong, M. M. St. Andrew's, N. B.
G. Houlton, M. C. B. St. Andrew's, N. B.
New Brunswick & Can. Ry. (See New Brun.)
New Castle R. R. 3-6 g. 5 m. 2 lo. 76 cars.
Geo. Pearson, Gen. Man. New Castle, Pa.
New Castle & Beaver Valley R. R. (See Penna. Co.)
New Haven & Derby R. R. 4-8½ g. 13 m. 4 lo. 70 c.
E. S. Quintard, Supt. New Haven, Conn.
J. M. Whitlock, M. M. & C. B. New Haven, Conn.
New Haven & No'mpton. 4-8½ g. 170 m. 27 lo. 598 c.
S. B. Opdyke, Jr., Supt. New Haven, Ct.
R. G. Curtis, Pur. Agt. New Haven, Ct.
Henry Fox, M. M. New Haven, Ct.
John Sweeny, For. Car. Shps. New Haven, Ct.
New Jersey & New York Ry. 4-8½ g. 37 m. 6 lo. 40 c.
J. D. Hasbrouck, Gen. Man. Jersey City, N. J.
J. S. Drake, Supt. & M. M. Hillsdale, N. J.
L. B. Van Wagonen, M. C. B. Hillsdale, N. J.
N. J. Southern Ry. (See Phil. & Read.; N. J. So. Div.)
New London Northern R. R. (See Central Ver.)
New Mexico Cent. & No. Ry. 3 g. 124 m. 5 lo. 100 c.
W. G. Corbin, Pres. & Gen. Man. Las Vegas, N. M.
D. C. Blackman, Supt. Las Vegas, N. M.
J. L. Greatsinger, M. M. Las Vegas, N. M.
New Orleans Pacific Ry. (See Mo. Pac.; (6) Div.)
New Orleans & Carrollton R. R.
4-8½ g. 15 m. 12 lo. 79 cars.
C. V. Haile, Supt. New Orleans, La.
John Dahmer, M. M. New Orleans, La.
Jas. Thorn, M. C. B. New Orleans, La.
New Orleans & Mobile R. R. (See Louis. & Nash.)
N. O. & Northeastern R. R. (See Cin., N. O. & Tex. Pac.)
New Orleans & Selma R. R. 5 g. 21 m. 1 lo. 8 cars.
L. B. Schofield, Supt. Selma, Ala.
N. Y. Central & Hudson River R. R.
4-8½ g. 983 m. 676 lo. 25,161 cars.
J. M. Toucey, Gen. Supt. New York, N. Y.
R. C. Moore, Pur. Agt. New York, N. Y.
Wm. Buchanan, Supt. M. P. New York, N. Y.
L. Garey, Supt. Car Dept. New York, N. Y.
N. Y. & Har. Div.: C. M. Bissell, Supt. do.
P. McQ. Gibson, M. M. New York, N. Y.
C. E. Garey, M. C. B. Morrisania, N. Y.
Hud. Riv. Div.: C. M. Bissell, Supt. N. York, N. Y.
Peter Smith, M. C. B. New York, N. Y.
E'n Div.: Zenas C. Priest, Supt. Utica, N. Y.
John Ortton, M. M. West Albany, N. Y.
M. C. B. West Albany, N. Y.
W'n Div.: Geo. H. Burrows, Supt. Rochester, N. Y.
S. L. White, M. M. Syracuse, N. Y.
Amos Gould, M. M. E. Buffalo, N. Y.
E. A. Olmstead, M. C. B. E. Buffalo, N. Y.
C. H. Burchard, M. C. B. E. Rochester, N. Y.
Rd. Donaby, M. C. B. Niagara Falls, N. Y.
N. Y. Chic. & St. L. Ry. 4-8½ g. 513 m. 115 lo. 4,838 c.
Lewis Williams, Gen. Man. Cleveland, O.
Jno. Mackenzie, Supt. M. P. Cleveland, O.
Eas'tn Div.: G. H. Kimball, Supt. Cleveland, O.
E. A. Miller, M. M. Conneaut, O.
West'n Div.: A. H. Evans, Supt. Chicago, Ill.
Jas. Eckford, M. M. Bellevue, O.
New York City & Northern. 4-8½ g. 54 m. 17 lo. 368 c.
Frank S. Gannon, Gen. Supt. High Bridge, N. Y.
Tho. Miller, M. M. High Bridge, N. Y.
New York, Lackawanna & W'n Ry. (See Del., L. & W.)
New York, Lake Erie & Western R. R.
E. S. Bowen, V. Pr. New York, N. Y.
(1) N. Y., L. E. & W. Div.: 4-8½ g. 1,073 m. 576 lo. 30,553 c.
B. Thomas, Gen. Supt. Jersey City, N. J.
J. A. Hardenburgh, Pur. Agt. New York, N. Y.
F. M. Wilder, Supt. M. P. & M. Susqueh'a, Pa.
E'n Div.: E. O. Hill, Supt. Jersey City, N. J.
J. H. Vreeland, M. M. Jersey City, N. J.
J. N. Mileham, M. C. B. Jersey City, N. J.
Del. Div.: W. J. Murphy, Supt. Port Jervis, N. Y.
J. Van Vechten, M. M. & C. B. Pt. Jervis, N. Y.
Susq. Div.: J. Jolls, Supt. Elmira, N. Y.
V. Blackburn, M. M. Susquehanna, Pa.
D. B. Goodell, M. C. B. Elmira, N. Y.
Buf. & R. Divs.: Chas. Neilson, Supt.; and
G. B. Ross, M. M. Buffalo, N. Y.
M. Wilder, M. C. B. Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, Supt. do.
W'n Div.: W. B. Coffin, Supt. Hornellsville, N. Y.
Geo. H. Griggs, M. M. Hornellsville, N. Y.
N. Y. & Greenwood L. Ry. 4-8½ g. 44 m. 8 lo. 53 c.
Stephen Smith, Supt. Jersey City, N. J.
F. A. Stinard, M. M. Pompton, N. J.
(2) N. Y., Pa & O. Div.: 4-8½ g. 565 m. 221 lo. 7,794 c.
J. M. Ferris, Gen. Supt. Cleveland, Ohio.
J. H. Holway, Pur. Agt. Cleveland, Ohio.
Wm. Fuller, Gen. M. M. & C. B. Cleveland, O.
S. V. Smith, Asst. Gen. M. C. B. Kent, Ohio.
E'n Div.: A. L. Dunbar, Supt. Meadville, Pa.
J. A. Cooper, M. M. Meadville, Pa.
D. S. Dockstader, M. C. Rep. Meadville, Pa.
W'n Div.: T. A. Phillips, Supt. Galion, O.
Wm Hill, M. M. Galion, O.
J. W. Holmes, For. Car Rep. Galion, O.
Geo. Wilson, For. Car Rep. Dayton, Ohio.
Maho'g Div.: N. F. Wood, Supt. Cleveland, O.
N. Wright, M. M. Cleveland, O.
C. N. Thorp, M. C. Rep. Cleveland, O.

New York, New Haven & Hartford R. R.
4-8½ g. 203 m. 123 lo. 2,768 cars.
E. M. Reed, V. P. & Gen. Man. New Haven, Ct.
R. N. Dowd, Pur. Agt. New Haven, Ct.
N. Y. & N. H. Div.: W. H. Stevenson, Supt. N. Y.
Shore Line and Air Line Divs.:
O. M. Shepard, Supt. N. Haven, Ct.
H. Kettendorf, Supt. M. P. New Haven, Ct.
Jas. Denver, M. C. B. New Haven, Ct.
Hart. Div.: C. S. Davidson, Supt. Hartford, Ct.
John Henny, Jr., Supt. M. P. & M. C. B. do.
N. Y., Ontario & Western Ry. (See N. Y., W. Sh. & Buf.)
N. Y., Pittsb'h & Chicago. 4-8½ g. 20 m. 2 lo. 32 c.
Geo. W. Dixon, Supt. New Galilee, Pa.
H. T. Hanna, Pur. Agt. Pittsburgh, Pa.
N. Y., Pennsylvania & Ohio R. R. (See N. Y., L. E. & W.)
New York, Philadelphia & Norfolk R. R.
4-8½ g. 10 m. 1 lo. 4 cars.
J. L. Bates, Supt. Pocomoke City, Md.
New York, Providence & Boston R. R.
4-8½ g. 83 m. 29 lo. 430 cars.
J. B. Gardner, Supt. Providence, R. I.
Giles F. Ward, Pur. Agt. Stonington, Conn.
J. H. Anderson, M. M. & C. B. Providence, R. I.
N. Y., Susqueh'na & W'n. 4-9 g. 147 m. 33 lo. 1,469 c.
F. A. Potts, Gen. Man. New York, N. Y.
C. D. McKelvey, Asst. Supt. Jersey City, N. J.
C. T. Demarest, Pur. Agt. New York, N. Y.
W. C. Ennis, M. M. & C. B. Wortendyke, N. J.
New York, Texas & Mexican Ry.
4-8½ g. 92 m. 6 lo. 95 cars.
Allen McCoy, Gen. Man. Victoria, Tex.
J. G. Conlon, M. M. Victoria, Tex.
New York, West Shore & Buffalo.
4-8½ g. 850 m. 98 lo. 2,907 c.
J. D. Layng, Gen. Man. New York, N. Y.
C. D. Gorham, Asst. Gen. Supt. Weehawken, N. J.
P. S. Bemis, Pur. Agt. New York, N. Y.
R. H. Soule, Supt. M. P. Frankfort, N. Y.
H. R. Div.: C. W. Bradley, Supt., Weehawken, N. J.
Harry Linn, M. M. New Durham, N. J.
Moh'k Div.: H. W. Gardiner, Supt. Syracuse, N. Y.
Buff. Div.: F. E. Merrill, Supt. Buffalo, N. Y.
New York, Ontario & Western.
J. E. Childs, Gen. Supt. New York, N. Y.
N. Y. Woodhaven & Rockaway R. R. (See Long Is.)
N. Y. & Greenwood Lake Ry. (See N. Y., L. E. & W.)
N. Y. & Manhattan Beach Ry. (See Long Island.)
New York & Long Branch R. R. (See Phil. & Read.)
New York & New England R. R.
4-8½ g. 478 m. 127 lo. 3,399 cars.
Gen. Man. Boston, Mass.
W. W. McKim, Pur. Agt. Boston, Mass.
Supt. M. P. & M. Boston, Mass.
W. G. Tabor, M. M. Boston, Mass.
H. E. Barker, Gen. Fore. Norwood, Mass.
East Div: W. H. Turner, Supt. Boston, Mass.
Nor. Div.: P. St. M. Andrews, Supt. Norwich, Ct.
W. A. Stone, M. M. Norwich, Ct.
Prov. Div.: L. W. Palmer, Supt. Providence, R. I.
Hfd. Div.: E. Holbrook, Supt. Hartford, Ct.
E. M. Humstone, M. M. Hartford, Ct.
D. F. Andregg, For. C. Dept. Hartford, Ct.
New York & Sea Beach R. R. 4-8½ g. 6 m. 4 lo. 40 c.
C. W. Douglass, Supt. Bay Ridge, N. Y.
W. A. Sheldon, Supt. Bay Ridge, N. Y.
Newark, Somerset & Straitsville R. R. (See B. & O.)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 59 miles.
C. L. Kimball, Gen. Supt. Matteawan, N. Y.
W. G. Van Buskirk, M. M. & C. B., Dutchess Junction, N. Y.
Newfoundland Ry. 3-6 g. 45 m. 7 lo. 41 c.
C. X. Hobbs, Gen. Man. St. John's, N'f'd.
Norfolk Southern R. R. 4-8½ g. 74 m. 7 lo 182 c.
M. K. King, Gen. Man. & Pur. Agt. Norfolk, Va.
J. S. Whitworth, M. M. & C. B. Norfolk, Va.
Norfolk & Ocean View Narrow Gauge R. R.
3 g. 8 m. 2 lo. 9 cars.
W. H. Taylor, Pres. Norfolk, Va.
Norfolk & Western R. R. (See Shenandoah Val.)
North-Eastern R. R. of Ga. 5 g. 72 m. 2 lo. 20 cars.
H. R. Bernard, Supt. Athens, Ga.
North-Eastern R. R. (S. C.) (See Wil. & Wel.)
North Pacific Coast R. R. 3 g. 84 m. 12 lo. 320 cars.
David Nye, Gen. Supt. San Rafael, Cal.
W. F. Russell, Pur. Agt. San Francisco, Cal.
J. Fowler, M. M. Saucelito, Cal.
North Shore Ry. 4-8½ g. 209 m. 21 lo. 564 c.
W. Wainwright, Gen. Man. Montreal, Can.
A. Davis, Supt. & Pur. Agt. Quebec, Can.
Northern (N. H.), and Concord & Claremont Rys.
4-8½ g. 173 m. 25 lo. 569 cars.
Geo. E. Todd, Supt. Concord, N. H.
M. M. & C. B. & Pur. Agt. do.
Northern (N. J.) R. R. (See N. Y., L. E. & W'n.)
Northern Central Ry. (See Penna. R. R. (6) Div.)
North'n Pacific R. R. 4-8½ g. 2,207 m. 391 lo. 9,897 c.
T. F. Oakes, Gen. Man. St. Paul, Minn.
John H. Ames, Gen. Pur. Agt. St. Paul, Minn.
Geo. W. Cushing, Supt. M. P., M. & R. S. do.
(1) E'n Div.: J. T. Odell, A. Gen. Man. St. Paul, Minn.
H. J. Small, A. S. Mach. Brainerd, Minn.
1st Gr. Div.: M. C. Kimberly, Supt. St. Paul, Minn.
Frank Howard, M. C. B. Brainerd, Minn.
2d Grand Div.: J. M. Graham, Supt. Fargo, Dak.
C. C. Quinn, M. M. Fargo, Dak.
3d Gd. Div.: D. R. Taylor, Supt. Mandan, Dak.
E. F. Doran, M. M. Mandan, Dak.
4th Gr. Div.: S. R. Ainslie, Supt. Glendive, Mont.
S. L. Bean, M. M. Glendive, Mont.
J. C. Munro, M. M. Livingston, Mont.
(2) W'n Div.: J. M. Buckley, Asst. Gen. Man.; and
Otis Sprague, Supt. New Tacoma, W. T.
H. D. Sanborn, Asst. P. Agt. Portland, Ore.
W. T. Small, A. S. Mach. Sprague, W. T.
Robt. Walker, M. C. B. Sprague, W. T.
H. H. Warner, M. M. New Tacoma, W. T.
S. Wishart, M. C. B. New Tacoma, W. T.
Mo. Div.: B. F. Matthias, Supt. Bismark, Dak.
Pend d'Ore Div.: F. F. Griffin, Supt. Sprague, W. T.
J. Evans, M. M. Sprague, W. T.
Northern & North-W'n Rys. 4-8½ g. 378 m. 50 lo. 1,195 c.
James Webster, Supt. Toronto, Can.
W. C. Schreeber, Pur. Agt. Toronto, Can.
P. Clarke, M. M. Toronto, Can.
Nova Scotia Ry. 4-8½ g. 79 m. 9 lo. 268 c.
C. A. Scott, Gen. Man. New Glasgow, N. S.
M. F. Punch, M. M. New Glasgow, N. S.

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 122 m. 33 lo. 1,694 cars.
A. A. Gaddis, Gen. Man. Ogdensburg, N. Y.
E. B. Burnham, Pur. Agt. Ogdensburg, N. Y.
Abr. Klohs, Supt. & M. M. Malone, N. Y.
J. N. Brown, Master Builder. Ogdensburg, N. Y.
Ohio Central R. R. 4-8½ g. 325 m. 46 lo. 4,760 cars.
John E. Martin, Rec. Toledo, O.
T. M. Peelar, Supt. Bucyrus, O.
F. W. Stewart, Pur. Agt. Toledo, O.
J. B. Morgan, M. M. & C. B. Bucyrus, O.
Ohio Southern R. R. (See Ind., Bloom. & W'n.)
Ohio & Mississippi Ry. 4-9 g. 616 m. 113 lo. 2,501 cars.
W. W. Peabody, Gen. Man. Cincinnati, O.
G. E. Atwood, Pur. Agt. Cincinnati, O.
J. H. Setchel, Gen. M. M. Cincinnati, O.
Cin. Div.: C. B. Cole, Supt. Seymour, Ind.
John Thumser, M. M. Seymour, Ind.
J. P. Coulter, M. C. B. Aurora, Ind.
Arthur Donaldson, M. M. Vincennes, Ind.
St. L. & Sp. Div.: C. M. Stanton, Supt. St. Louis, Mo.
J. W. Stokes, M. M. (Spring. Div.). Pana, Ill.
Louis. Div.: C. B. Cole, Supt. Louisville, Ky.
Oil City & Chicago R. R. (See Buff., N. Y. & Phil.)
Old Colony R. R. 4-8½ g. 470 m. 120 lo. 3,527 cars.
J. R. Kendrick, Gen. Man. Boston, Mass.
Main Li. Div.: J. H. French, Supt. Boston, Mass.
Jas. N. Lauder, Supt. M. P. Boston, Mass.
Berkley Powell, M. M. Boston, Mass.
R. W. Husted, Pur. Agt. Boston, Mass.
Sam'l Stevens, M. C. B. Boston, Mass.
Cape Cod Div.: C. H. Nye, Supt. Hyannis, Mass.
No. Div.: S. A. Webber, Supt. Fitchburg, Mass.
Sam. Stevens, M. C. B. Taunton, Mass.

Goodell & Waters

PHILADELPHIA, PA.

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FINISHING,
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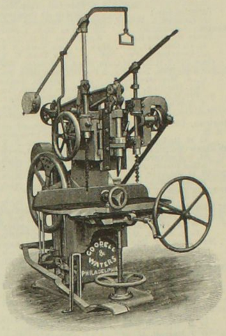
BORING, ETC.



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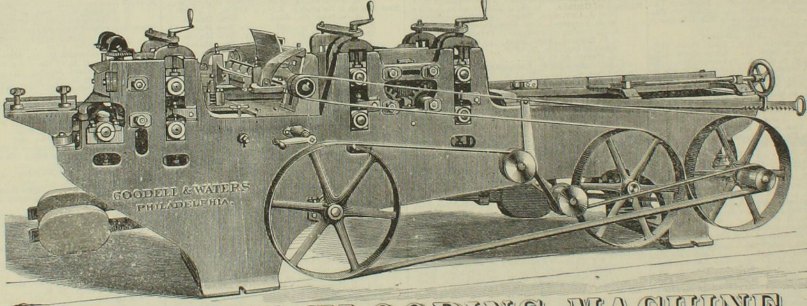
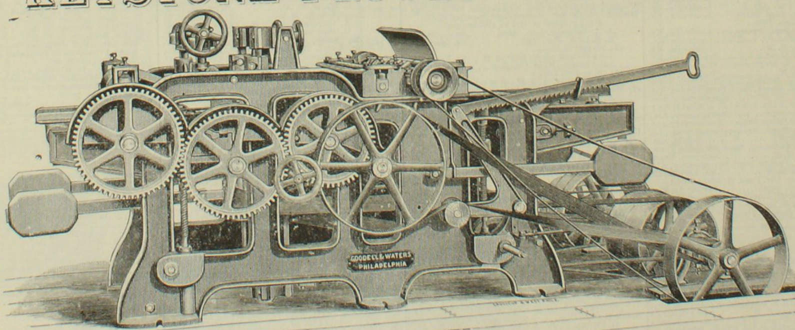


KEYSTONE FLOORING MACHINE.



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Oregon Ry. & Navigation Co.
3 & 4-8½ g. 577 m. 72 lo. 1,611 cars.
C. H. Prescott, *V. P. & Gen. Man.* Portland, Ore.
F. T. Dodge, *Supt.* (Riv. Div.)....Portland, Ore.
H. S. Rowe, *Supt.* (Ry Div.)......Portland, Ore.
J. M. Drake, *Pur. Agt*..........Portland, Ore.
Goodall, Perkins & Co., *Supt.* (Ocean Div.) San Francisco, Cal.
C. C. Hobart, *Gen. M. M*......The Dalles, Ore.
Chas. A. Phipps, *M. C. B*.....The Dalles, Ore.
Oregon & California R. R. 4-8½ g. 333 m. 23 lo. 576 c.
R. Koehler, *Act. Man*............Portland, Ore.
J. Brandt, *Gen. Supt*............Portland, Ore.
A. Brandt, *M. M*................Portland, Ore.
Owensboro & Nashville R. R. 5 g. 44 m. 3 lo. 70 c.
M. Newbold, *Supt*...........Owensboro, Ky.
H. M. Gabel, *M. M. & C. B*....Owensboro, Ky.
Oxford & Henderson R. R. 4-8½ g. 13 m. 2 lo. 11 c.
James A. White, *Gen. Supt*...Henderson, N. C.
James E. Lawrence, *M. M*...Henderson, N. C.

P

Pacific Coast Ry. 3 g. 64 m.
J. M. Fillmore, *Manager* San Luis Obispo, Cal.
W. H. Masterman, *M. M. & C. B.* do.
Painesville & Youngstown Ry. 3 g. 65 m. 7 lo. 319 c.
R. K. Paige, *Rec. & Man*........Painesville, O.
J. A. Newcome, *Supt. R. S*.....Painesville, O.
Panama R. R. 5 g. 48 m. 16 lo. 608 cars.
H. A. Woods, *Supt*........Aspinwall, U. S. Col.
E. Z. Penfield, *Pur. Agt*.......New York, N. Y.
D. P. Wright, *M. M*........Aspinwall, U. S. Col.
Passumpsic R. R. 4-8½ g. 147 m. 28 lo. 1,101 cars.
E. Raymond, *Pres. & Pur. Agt*. Boston, Mass.
H. E. Folsom, *Supt*...........Lyndonville, Vt.
L. L. Brigham, *M. M*.........Lyndonville, Vt.
L. F. Woodard, *M. C. B*......Lyndonville, Vt.
Paulding & Cecil Railway. 4-8½ g. 7 m. 3 lo. 28 c.
S. Frank Eagle, *Pres*.................Cecil, O.
Paw Paw and Toledo & South Haven R. Rds.
3 g. 20 m. 3 lo. 16 cars.
John Ihling, *Supt*................Lawton, Mich.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
G. R. Dickey, *Supt. & Pur. Agt*......York, Pa.
E. H. Williams, *M. C. B*..............York, Pa.
W. P. Kirk, *M. M*...................Oxford, Pa.
Pemigewasset Valley R. R. 4-8½ g. 21 m. 2 lo. 127c.
J. Thomas Vose, *Pres*.......Boston, Mass.
Pennsylvania Co.'s (5) Roads.
4-9 g. 3,222 m. 920 lo. 32,809 cars.
Gen. Divs. (1), (2), (3), (4) and (5).
Wm. A. Baldwin, *Gen. Man*.....Pittsburg, Pa.
John Thomas, *Gen. Supt*.....Pittsburg, Pa.
Wm. Mullins, *Gen. Pur. Agt*......Pittsburg, Pa.
Joseph Wood, *Supt. M. P*.....Fort Wayne, Ind.
(1) Pittsburg, Ft. Wayne & Chicago Ry.
4-9 g. 468 m. 288 lo. 8,023 cars.
E'n Div.: A. B. Starr, *Supt*.......Allegheny, Pa.
Geo. J. Parkin, *M. M*.........Allegheny, Pa.
D. M. Peppard, *M. M*..........Crestline, O.
W'n Div.: C. D. Law, *Supt*.....Ft. Wayne, Ind.
F. D. Casanave, *M. M*........Ft. Wayne, Ind.
A. H. Somers, *Gen. For. Shops*...Chicago, Ill.
(2) Ashtabula & Pittsburg, and
(3) Erie & Pittsburg R. Rds. 221 m. 29 lo. 1,362 c.
John M. Kimball, *Supt*..Lawrence Junc., Pa.
J. A. Wood, *Gen. For. Shops*........Erie, Pa.
(4) Cleveland & Pittsb'g R. R. 225 m. 97 lo. 3,534 c.
R. F. Smith, *Asst. Man*..........Cleveland, O.
Philip Bruner, *Supt*............Wellsville, O.
W. F. Beardsley, *Mast. of Mach.* Wellsville, O.
(5) No-W'n Ohio Ry.: J. S. Morris, *Supt*...Toledo, O.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 3,158 m. 1,459 loco. 66,816 cars.
Chas. E. Pugh, *Gen. Man*......Philadelphia, Pa.
Enoch Lewis, *Pur. Agt*.......Philadelphia, Pa.
John Reilly, *Supt. Trans*.....Philadelphia, Pa.
T. N. Ely, *Gen. S. M. P*..............Altoona, Pa.
(1) Pennsylvania R. R. Divs.
4-9 g. 1,213 m. 705 lo. 46,819 cars.
S. M. Prevost, *Gen. Supt*.........Altoona, Pa.
Frank L. Sheppard, *Supt. M. P*..Altoona, Pa.
G. W. Strattan, *M. M*..........Altoona, Pa.
Jno. P. Levan, *Gen. Fore*......Altoona, Pa.
Phila. Div.: Tho. Gucker, *Supt.* Philadelphia, Pa.
H. D. Garrett, *M. M*....W. Philadelphia, Pa.
I. W. Van Houten, *Gen. For*....W. Phila., Pa.
Mid. Div.: O. E. McClellan, *Supt.* Harrisburg, Pa.
E. L. Caum, *M. M*...........Harrisburg, Pa.
Samuel W. Myers, *Gen. For.* Harrisburg, Pa.
Altoona Div.: Jas. Reed, *Supt*.......Altoona, Pa.
Pitts. Div.: Robert Pitcairn, *Supt*....Pittsburg, Pa.
D. O. Shaver, *M. M*...........Pittsburg, Pa.
J. G. Stewart, *Gen. For*........Pittsburg, Pa.
W. Pa. Div.: A. P. Kirtland, *Supt.* Blairsville, Pa.
Wm. B. Norris, *M. M*..........Blairsville, Pa.
M. H. Falls, *Gen. For*.........Blairsville, Pa.
Fred. Div.: J. B. Hutchinson, *Supt*.....York, Pa.
Tyrone Div.: S. S. Blair, *Supt*.......Tyrone, Pa.
Lew. Div.: Wm. M. Phillips, *Supt.* Lewistown, Pa.
Bed. Div.: R. L. Holliday, *Supt*......Bedford, Pa.
Monong. Div.: David M. Watt, *Supt.* Pittsburg, Pa.
Wm. Lininger, *M. M*............Pittsburg, Pa.
(2) United R. Rs. of N. J. Divs. 471 m. 330 lo. 4,041 c.
F. Wolcott Jackson, *Gen. St*..Jersey City, N. J.
H. S. Hayward, *Supt. M. P*...Jersey City, N. J.
David H. Baker, *Gen. For*...Jersey City, N. J.
N. Y. Div.: Robt. E. Pettit, *Supt.* Jersey City, N. J.
L. A. Bosdevex, *M. M*.........Jersey City, N. J.
E. F. Bosdevex, *Gen. For*..Jersey City, N. J.
Belv. Div.: J. A. Anderson, *Supt.* Lambertv., N. J.
R. McDowell, *M. M*.......Lambertville, N. J.
Amboy Div.: I. S. Buckalew, *Supt.* Camden, N. J.
Thos. Kerr, *M. M*...........So. Amboy, N. J.
P. S. Bogart, *Gen. For*......So. Amboy, N. J.
(2½) Camden & At. Rd.: 75 m. 18 l. 261 c.
W. N. Bannard, *Supt*.................and
Rufus Hill, *M. M*...............Camden, N. J.
Samuel Wills, *M. C. B*..........Camden, N. J.
(3) West Jersey R. R. 4-9 g. 188 m. 27 lo. 294 cars.
Joseph Crawford, *Gen. Supt*.....Camden, N. J.
W. McAlister, *M. M*..............Camden, N. J.
C. C. Williams, *Gen. For*........Camden, N. J.
(4) Phila., Wilm. & Balt. R.R. 409 m. 128 lo. 1,882 c.
H. F. Kenney, *Gen. Supt*.....Philadelphia, Pa.
J. M. Wallis, *S. M. P*.........Philadelphia, Pa.
H. D. Gordon, *M. M*.........Wilmington, Del.
W. H. Lungren, *M. C. B*......Wilmington, Del.
Cen. Div.: L. K. Lodge, *Supt*..........Media, Pa.
Del. Div.: I. N. Mills, *Supt*......Wilmington, Del.
Mo. Div.: H. H. Carter, *Supt*..Wilmington, Del.
(5) Phila. & Erie R. R. Divs.: 437 m. 110 lo. 3,089 c.
R. Neilson, *Gen. Supt*.......Williamsport, Pa.
A. O. Dayton, *Supt. Mo. Po*..Williamsport, Pa.
E'n. Div.: E. B. Westfall, *Supt.* Williamsport, Pa.
Sun. H. & W. Div: A. Walter, *Supt.*; and
H. K. Stout, *M. M*..............Sunbury, Pa.
Mid. Div.: Tho. A. Roberts, *Supt*.....Renovo, Pa.
Wm. L. Holman, *M. M*...........Renovo, Pa.
West'n Div.: J. W. Reynolds, *Supt*.....Erie, Pa.
W. T. Smith, *M. M*.....................Erie, Pa.
(6) Northern Central Ry. 4-9 g. 346 m. 152 lo. 6,610 c.
Robert Neilson, *Gen. Supt*...Williamsport, Pa.
A. O. Dayton, *Supt. M. P*....Williamsport, Pa.
A. W. Sumner, *Pur. Agt*.........Baltimore, Md.
J. M. Coale, *M. M*...............Baltimore, Md.
G. W. Demarest, *Gen. For*......Baltimore, Md.
Susq. Div.: E. B. Westfall, *Supt.* Williamsport, Pa.
Sham. Div.: A. Walter, *Supt*........Sunbury, Pa.
Elm. & Can. Divs.: S. Meade, *Supt*..Elmira, N. Y.
Jas. Strode, *M. M*..................Elmira, N. Y.
J. C. Dyott, *Gen. For*..............Elmira, N. Y.
Baltimore Div.: H. W. Kapp, *Supt.* Baltimore, Md.
(7) Balt. & Pot. & Alex. & Fred. 125 m. 30 lo. 300 c.
H. F. Kenny, *Gen. Supt*.......Philadelphia, Pa.
A. W. Sumner, *Pur. Agt*..........Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po*....Philadelphia, Pa.
H. D. Gordon, *M. M*............Wilmington, Del.
J. Lescallett, *For. Mach. Shop.* Washington, D.C.
R. F. Downs, *For. Car Shop*..Washington, D.C.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 3,271 c.
J. B. Smith, *Gen. Supt*............Dunmore, Pa.
And. Crane, *M. M*..................Dunmore, Pa.
Geo. W. Simpson, *M. C. B*........Dunmore, Pa.
Pennsylvania, Slatington & New England R. R.
In progress. 4-8½ g. 18 m. 1 lo. 20 cars.
C. H. Stanton, *Supt*...........New York, N. Y.

Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, *Gen. Supt*...........Ridgeway, Pa.
Pensacola & Atlantic R. R. 5 g. 161 m. 9 lo. 67 cars.
W. D. Chipley, *Gen. Supt*.......Pensacola, Fla.
W. D. Robb, *M. M*..............Pensacola, Fla.
Pensacola & Perdido R. R. 5 g. 10 m. 5 lo. 92 cars.
B. F. Simmons, *Pr. & Supt*....Pensacola, Fla.
H. W. Simmons, *Pur. Agt*......Pensacola, Fla.
J. C. Schulte, *M. M*............Pensacola, Fla.
People's Ry. 4-8½ g. 15 m. 2 lo. 14 cars.
W. D. Pollard, *Supt*.............Pottsville, Pa.
Peoria, Decatur & Evansville Ry.
4-8½ g. 254 m. 30 lo. 1,487 cars.
G. L. Bradbury, *Gen. Man*..........Peoria, Ill.
G. R. Cobleigh, *Supt. & Pur. Agt*..Peoria, Ill.
P. Reilly, *M. M*....................Mattoon, Ill.
Peoria & Farmington R. R. (*See Cen. Ia.*)
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 106 c.
Thos. B. Burnett, *Gen. Supt. & P. A.* Peoria, Ill.
R. F. Hurd, *M. M. & C. B*..........Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, *Supt*......Perkiomen Junction, Pa.
H. Boyd, *Pur. Agt*...............Norristown, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 133 cars.
R. M. Sully, *Gen. Supt*.........Petersburg, Va.
Geo. F. Jones, *Pur. Agt*........Petersburg, Va.
R. B. Andrews, *M. M*...........Petersburg, Va.
J. W. Fleming, *M. C. B*.........Petersburg, Va.
Phila., Wilmington & Balt. R. R. (*See Penna. R. R.*)
Peterborough & Hillsborough. (*See Northern, N. H.*)
Philadelphia, Newtown & New York R. R.
4-8½ g. 23 m.
W. M. Geary, *Supt*............Philadelphia, Pa.
Phila. & Atlantic City Ry. 3-6 g. 55 m. 11 lo. 134 cars.
F. S. Urie, *Supt*.................Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*.......Philadelphia, Pa.
H. M. Messimer, *M. M*..............Camden, N. J.
E. Lippincott, *M. C. B*...........Camden, N. J.
Philadelphia & Erie R. R. (*See Penna. R. R.; (5) Div.*)
Philadelphia & Reading R. R. (and Branches.)
4-8½ g. 1,582 m. 907 lo. 56,775 cars.
John E. Wootten, *Gen. Man*..Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*.....Philadelphia, Pa.
Geo. Eltz, *Supt. Trans*..........Reading, Pa.
L. B. Paxson, *Eng. of Mach*......Reading, Pa.
No. Pa. & Bound Brook Div.:
I. A. Sweigard, *Supt*........Philadelphia, Pa.
Mahanoy & Shamokin and other Brs.:
J. H. Olhausen, *Supt*...........Pottsville, Pa.
D. C. Reinhart, *Asst. Supt*....Catawissa, Pa.
A. A. Hesser, *Asst. Supt* Mahanoy Plane, Pa.
Schuylkill & Susquehanna Br.:
H. H. Tracy, *Supt*..........Pine Grove, Pa.
Reading & Columbia Br.:
A. M. Wilson, *Supt*.............Columbia, Pa.
(2) N. J. Central Div.:
W. W. Stearns, *Supt*..........Elizabeth, N. J.
W. Woodcock, *M. M*........Elizabethport, N. J.
Geo. Hackett, *M. C. B*.....Elizabethport, N. J.
C. G. Williams, *M. M*.........Jersey City, N. J.
John Alpaugh, *M. M*.........Phillipsburg, N. J.
L. Br. Div.: H. H. Nieman, *Supt*..Long Branch, N. J.
N. J. So. Div.: R. Blodgett, *Supt*...Manchester, N. J.
Wm. Montgomery, *M. M*....Manchester, N. J.
Chas. N. Sawyer, *M. C. B*....Manchester, N. J.
Lehigh & Susquehanna Div.:
W. S. Polhemus, *Supt*.....Mauch Chunk, Pa.
Pittsburg, Bradford & Buffalo Ry. (*See Pitts. & West.*)
Pittsburg, Chartiers & Youghiogheny R. R.
4-8¾ g. 19 m.
Geo. S. Griscom, *Gen. Man*......Pittsburg, Pa.
Pittsburgh, Cincinnati & St. Louis Ry (5 Gen. Divs.)
4-9 g. 916 m. 239 lo. 7,133 cars.
James McCrea, *Manager*.......Columbus, O.
Wm. Mullins, *Pur. Agt*.........Pittsburg, Pa.
Edward B. Wall, *Supt M. P*......Columbus, O.
(1) P., C. & St. L. Div.: E. B. Taylor, *Supt.* Pittsburg, Pa.
C. B. Street, *M. M*...............Dennison, O.
J. M. Copeland, *G. F. Car Shops.* Steubenville, O.
(2) C. & M. V. Div.: W. F. Black, *Supt*..Zanesville, O.
Leroy Kells, *M. M*..............Lancaster, O.
Wm. Meikle, *Gen. For*...........Lancaster, O.
Daniel Jewell, *Gen. F. Car Shops.* Lancaster, O.
(3) Li. Mi. Div.: Ralph Peters, *Supt*....Cincinnati, O.
Leroy Kells, *M. M*...............Cincinnati, O.
Jos. Underwood, *G. F. Car Shops.* Cincinnati, O.
(4) J. M. & I. R. R.: E. W. McKenna, *Supt.* Louisville, Ky.
Wm. Swanston, *M. M*....Jeffersonville, Ind.
Iw. Austin, *G. F. C. Shops.* Jeffersonville, Ind.
(5) Indianapolis & Vincennes R. R.
J. J. Turner, *Supt*.......Indianapolis, Ind.
Pittsburgh, Cleveland & Toledo R. R.
4-8¾ g. 78 m. 18 lo. 525 cars.
C. H. Andrews, *Pres*...........Youngstown, O.
W. C. Agnew, *Supt*.............Youngstown, O.
W. F. Hofecker, *M. M*.........Youngstown, O.
Pittsburg, Ft. Wayne & Chicago Ry. (*See Penna. Co.*)
Pittsburg Southern Ry. (*See Balt. & O.*)
Pitts. & Castle Shannon R. R. 3-4 g. 9 m. 5 lo. 428 c.
James M. Bailey, *Gen. Supt*.....Pittsburg, Pa.
Holmes Ward, *M. M*.......Castle Shannon, Pa.
Wm. E. Long, *M. C. B*...........Pittsburg, Pa.
Pitts. & Lake Erie R. R. 4-8¾ g. 70 m. 31 lo. 1,820 c.
W. C. Quincy, *Gen. Man*.........Pittsburg, Pa.
R. W. Jones, *Mast. Trans*.......Pittsburg, Pa.
S. W. Haines, *M. M*..............Pittsburg, Pa.
Pittsburgh, McKeesport & Youghiogheny.
4-8¾ g. 57 m. 19 lo. 267 cars.
W. C. Quincy, *Gen. Man*.......Pittsburgh, Pa.
R. W. Jones, *M. of Trans*......Pittsburgh, Pa.
S. W. Haines, *M. M*.............Pittsburgh, Pa.
Pitts. & Western R. R. 3 & 4-8½ g. 110 m. 18 lo. 365 c.
Pitts., Bradford & Buff. Ry. 3 g. 93 m. 8 lo. 163 c.
Tho. M. King, *Gen. Man*.........Allegheny, Pa.
J. T. Johnson, *Supt*...............Allegheny, Pa.
N. Bruce, *Pur. Agt*.................Allegheny, Pa.
W. M. Flahavhan, *M. M*.........Allegheny, Pa.
Pontiac, Oxford & Pt. Austin R. R. 100 m.
Geo. W. Debevoise, *Pr. & Gen. Man* Oxford, Mich.
Jas. Houston, *Gen. Supt*..........Oxford, Mich.
Port Huron & No.-Western Ry. 3 g. 218 m. 14 lo. 288 c.
H. McMorran, *G. Man. & P. A.* Port Huron, Mich.
J. R. Wadsworth, *Supt*.....Port Huron, Mich.
Chas. Deifenbach, *M. M*.....Port Huron, Mich.
Benj. Hillier, *M. C. B*.......Port Huron, Mich.
Port Jervis & Monticello R. R. 4-8½ g. 24 m. 3 lo. 13 c.
M. V. Heller, *Gen. Man*......Port Jervis, N. Y.
Port Royal & Augusta Ry. 5 g. 180 m. 16 lo. 310c.
J. N. Bass, *Supt*...................Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B* Augusta, Ga.
Portland & Ogdensburg. 4-8½ g. 110 m. 11 lo. 311 c.
J. Hamilton, *Gen. Supt. & P. A*..Portland, Me.
M. M.................Portland, Me.
W. G. Brewer, *M. C. B*...........Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 7 lo. 230 c.
J. W. Peters, *Supt. & Pur. Agt*...Portland, Me.
E. H. C. Tompson, *For. of Mach*..Portland, Me.
David Dow, *For. of Car Repairs*. Portland, Me.
Potomac, Fred.'g & Pied. R. R. 3 g. 38 m. 2 lo. 38 c.
Will M. Grafton, *Supt*.......Fredericksburg, Va.
W. J. Sweigard, *M. M*.......Fredericksburg, Va.
Pough., Hart. & Bos. R. R. 4-8½ g. 45 m. 4 lo. 65 c.
J. A. Perkins, *Supt*.........Poughkeepsie, N. Y.
John L. Donaldson, *M. M* Poughkeepsie, N. Y.
Pratt Coal & Coke Company's R. R. 5 g. 9 m. 5 lo. 100 c.
W. L. Gude, *Gen. Man*.......Pratt Mines, Ala.
Prescott & Thirty-Fifth Parallel R. R.
4-8½ g. 77 miles in progress.
Samuel A. Henszey, *Gen. Man*..Prescott, Ariz.
Prince Edward Island Ry. 3-6 g. 199 m. 18 lo. 280 c.
Jas. Coleman, *Supt. & Pur. Agt.*;
Jos. Unsworth, *M. Supt. & Storekeeper*; and
D. M. Fraser, *M. C. B*.....Charlottetown, P. E. I.
Profile & Franconia Notch R. R. 3 g. 15 m. 3 lo. 18 c.
Emmons Raymond, *Pur. Agt*.....Boston, Mass.
C. H. Greenleaf, *Supt*......Profile House, N. H.
Prospect Park & Coney Island R. R.
4-8½ g. 15 m. 8 lo. 123 cars.
R. Schermerhorn, *Supt*..........Brooklyn, N. Y.
Martin Painter, *M. M*...........Brooklyn, N. Y.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 6 lo. 79 c.
Waterman Stone, *Supt*.........Providence, R. I.
Rufus Smith, *M. M. & C. B*.........Bristol, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 4 lo. 92 c.
Wm. Tinkham, *Gen. Man*.....Providence, R. I.
G. T. Richardson, *M. M*........Providence, R. I.
Prov. & Worcester. 4-8½ g. 66 m. 34 lo. 1,155 c.
W. E. Chamberlain, *Supt*.....Providence, R. I.
A. Griggs, *Supt. L. & C. D*....Providence, R. I.

Pullman's Palace Car Co. 564 passenger cars.
A. B. Pullman, *2d V.-Pr. & G. M*..Chicago, Ill.
Geo. F. Brown, *Gen. Supt*..........Chicago, Ill.
Wm. A. Angell, *Pur. Agt*...........Chicago, Ill.
S. W. Bretzfield, *Asst. Pur. Agt.* New York, N. Y.
A. Rapp, *Man.* (Chicago Works)...Chicago, Ill.
H. L. Spaulding, *Man.* (Det Shops). Detroit, Mich.
E. A. Benson, *Supt. Shops*.......St. Louis, Mo.

Q

Quebec Central Ry. 4-8½ g. 147 m. 10 lo. 267 cars.
J. R. Woodward, *Gen. Man*..Sherbrooke, P. Q.
A. Steele, *Supt*.................Sherbrooke, Que.
R. D. Morkill, Jr., *Pur. Agt*..Sherbrooke, P. Q.
Jas. Seiveright, *M. M*.........Sherbrooke, P. Q.
Quebec, Montreal, Ottawa & Occidental Ry.
4-8½ g. 354 m. 36 lo. 993 cars.
L. A. Serecal, *Gen. Supt*.........Quebec, Que.
Quebec & Lake St. John Ry. 4-8½ g. 36 m. 3 lo. 55 c.
J. G. Scott, *Manager*................Quebec, Can.
Frank Fournier, *Supt*.......St. Raymond, P. Q.
John T. Eames, *M. M*.......St. Raymond, P. Q.
Queen Anne's & Kent and Townsend Branch R. R.
(*See Penna.; (4) Div.*)

R

Raleigh & Augusta Air-Line: Carolina Central.
Raleigh & Gaston R. Rs. 4-8½ g. 436 m. 50 lo. 994 c.
John C. Winder, *Gen. Man. & P. A.* Raleigh, N. C.
Raleigh Rds. 4-8½ g. 194 m. 22 lo. 563 cars.
B. R. Harding, *Supt. of Mach.* Raleigh, N. C.
Carolina Cen. R.R. 4-8½ g. 242 m. 26 lo. 431 c.
L. C. Jones, *Supt*.............Wilmington, N. C.
James Maglenn, *M. of Mach.* Laurinburg, N. C.
S. R. Ethridge, *M. C. B*......Laurinburg, N. C.
Rensselaer & Saratoga R.R. (*See Del. & Hud. Can. Co.*)
Rhinebeck & Connecticut. (*See Hart. & Ct. Wn.*)
Richmond, Fredericksburg & Potomac R. R.
4-8½ g. 83 m. 15 lo. 146 cars.
E. T. D. Myers, *Gen. Supt*.......Richmond, Va.
T. L. Courtney, *Asst. Supt*......Richmond, Va.
H. Kuhn, *M. M*....................Richmond, Va.
W. H. Trainham, *M. C. B*.........Richmond, Va.
Richmond & Alleghany R.R. 4-9 g. 261 m. 19 lo. 837c.
Decatur Axtell, *Rec. & Gen. Man.* Richmond, Va.
M. Sweeney, *Pur. Agt*............Richmond, Va.
Geo. D. Harris, *M. M. & C. B*...Richmond, Va.
Richmond & Danville R. R. Co.'s Roads.
1,736 miles 218 loco. 3,833 cars.
A. L. Rives, *Gen. Man*.........Richmond, Va.
Peyton Randolph, *As. G. Man*..Richmond, Va.
J. P. Minetree, *Pur. Agt*........Richmond, Va.
R. D. Wade, *Supt. Mo. Po*.......Richmond, Va.
(1) Rich. & Dan. R. R. 5 g. 847 m. 131 lo. 2,687 cars.
Rich. & Dan. Div.: 5 g. 320 m. 80 lo. 1,797 c.
Wm. H. Green, *Supt*..............Richmond, Va.
T. W. Gentry, *M. M*..............Richmond, Va.
J. B. Vaughan, *For. Car Sh*..Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
A. B. Andrews, *Supt*...............Raleigh, N. C.
W. H. Turrentine, *M. M.* Comp'y's Shops, N. C.
J. C. Holt, *For. Car Sh.* Comp'y's Shop, N. C.
Atlanta & Char. Air Line. 5 g. 286m. 31 lo. 415 c.
Narrow-Gauge Branches. 3 g. 80 m. 5 lo. 41 c.
Edmund Berkley, *Supt*..........Atlanta, Ga.
W. A. Walden, *M. M*.............Atlanta, Ga.
Z. T. Smith, *For. Car Sh*.........Atlanta, Ga.
(2) Charlotte, Col. & Aug. R. R. 5g. 239 m. 22 lo. 287 c.
G. R. Talcott, *Supt*..............Columbia, S. C.
J. H. Green, *M. M.* (2 roads)...Columbia, S. C.
(3) Columbia & Greenville R. R. 5 g. 297 m. 22 l. 224 c.
G. S. Talcott, *Supt*..............Columbia, S. C.
J. O. Meredith, *For. E. & C. Rep*.. do.
(4) Virginia Midland Ry. 4-8½ g. 353 m. 41 lo. 631 c.
W. M. S. Dunn, *Eng. & Supt.* Alexandria, Va.
J. E. Waddey, *M. of M*......Alexandria, Va.
J. T. Nalls, *M. C. B*...........Alexandria, Va.
Richmond & Petersburg R.R. 4-8½ g. 25 m. 8 lo. 132 c.
J. R. Kenly, *Supt*...............Richmond, Va.
John O'Brien, *M. M*.............Richmond, Va.
Rio Grande R. R. 3-6 g. 22 m. 3 lo. 40 cars.
M. J. Gomila, *Rec. & Gen. Man.* Brownsville, Tex.
G. W. Rendall, *M. M*..........Brownsville, Tex.
M. Markwood, *M. C. B*........Brownsville, Tex.
Rio Grande & Pecos Ry. 4-8½ g. 27 m. In progress.
W. W. Hungerford, *Man*..........Laredo, Tex.
Rochester & Lake Ontario Ry. 4-8½ g. 6 m. 2 lo. 10 c.
N. B. Ellison, *Man*...............Rochester, N. Y.
Rochester & Pittsb'g R.R. 4-8½ g. 260 m. 60 lo. 3,146 c.
Geo. E. Merchant, *Gen. Man*...Rochester, N. Y.
J. T. Gardiner, *Gen. Supt*....Rochester, N. Y.
J. P. Hovey, *M. M*..............Rochester, N. Y.
J. R. Sherburne, *For. Sh*.........Buffalo, N. Y.
Rock Island & Mercer County R. R., and
Rock I'd & Peoria Ry. 4-8½ g. 113 m. 13 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt*..Rock Island, Ill.
R. I. & P. Ry.: H. B. Sudlow, *Supt. & P. A.* do.
Joseph Elder, *M. M*..................Peoria, Ill.
R. I. & M. C. Rd.: B. T. Cable, *Supt.* R'k Island, Ill.
J. H. Parks, *M. M*...............Rock Island, Ill.
Rogersville & Jefferson R. R. 5 g. 16 m. 1 lo. 6 cars.
C. M. Leuty, *Supt*..............Rogersville, Tenn.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 17 cars.
Eben Hillyer, *Supt*....................Rome, Ga.
O. W. Harbin, *M. M. & C. B*..........Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4-8½ g. 417 m. 54 lo. 1,400 cars.
H. M. Britton, *Gen. Man. & P. A.* Oswego, N. Y.
Geo. H. Haselton, *M. M. & C. B*..Oswego, N. Y.
E'n Div.: J. D. Remington, *Supt.* Watertown, N. Y.
W'n Div.: W. H. Chauncey, *Supt*..Oswego, N. Y.
Roodhouse & Scottsville Ry. In progress.
Geo. P. Merrill, *Gen. Man*...........Chicago, Ill.
Ruby Hill R. R. (*See Eureka & Pal.*)
Rumford Falls & Buckfield R.R. 4-8½ g. 29 m. 2 l. 62 c.
L. L. Lincoln, *Supt. & Pur. Agt*...Canton, Me.

S

Sabine & East Texas Ry. (*See Cen. Pac.*)
Sacramento & Placerville R. R. (*See Cen. Pac.*)
Saginaw Bay & Northw'n R.R. 4-8½ g. 31 m. 6 lo. 136 c.
J. Jackson, *Gen. Man*.........Pinconning, Mich.
F. T. Lillote, *Act. Pur. Agt*...Pinconning, Mich.
Edward Keeler, *M. M*........Pinconning, Mich.
Saginaw, Tuscola & Huron R. R.
3 g. 50 m. 3 lo. 83 cars.
C. S. McMillan, *Gen. Supt*..E. Saginaw, Mich.
Saginaw Valley & St. Louis R. R. 4-8½ g. 39 m. 4 l. 64 c.
N. W. Merrill, *Supt*...............Saginaw, Mich.
Allan Bourn, *Pur. Agt*..............Detroit, Mich.
Geo. C. Watrous, *M. M*...............Iona, Mich.
Salisbury R. R. 4-8½ g. 11 m. 1 lo. 1 car.
R. J. Batzer, *Supt*...............Pittsburgh, Pa.
Salt Lake & Western R. R. (*See Un. Pac.; (6) Div.*)
San Francisco & No. Pac. 4-8½ g. 139 m. 11 lo. 245 c.
Arthur Hughes, *Gen. Man*..San Francisco, Cal.
H. C. Whiting, *Supt*.................Petaluma, Cal.
Ed. Reynolds, *Gen. M. M*.........Donahue, Cal.
Ed. Reynolds, *M. C. B*...........Donahue, Cal.
Sanborn, Cooperstown & Turtle M. R. R. In progress.
C. A. Roberts, *Gen. Man*.........Sanborn, Dak.
Sandy River R. R. 2 g. 18 m. 3 lo. 34 cars.
N. B. Beal, *Pres. & Supt*...........Phillips, Me.
M. Saunders, *M. M. & C. B*.........Phillips, Me.
Sandusky, Mansfield & Newark R. R. (*See B. & O.*)
Sanford & Indian River R. R. (*See So. Flor.*)
San Luis Obispo & Santa Maria R. R.
3 g. 20 m. 2 lo. 30 cars.
Charles Goodall, *Man*.......San Francisco, Cal.
San Pete Valley R. R. 3 g. 33 m. 2 lo. 57 cars.
F. C. Hand, *Supt*........................Wales, U. T.
J. E. Bamberger, *Pur. Agt*....Salt Lake, U. T.
B. Bates, *M. M*.........................Wales, U. T.
Santa Cruz R. R. (*See So. Pac.; Nor'n Div.*)
Saratoga, Mt. McGregor & Lake George R. R.
3 g. 11 m. 3 lo. 12 cars.
John McGee, *Supt*.....Saratoga Springs, N. Y.
Savannah, Florida & W'n Ry. 5 g. 425 m. 50 lo. 736 c.
H. S. Haines, *Gen. Man*.........Savannah, Ga.
R. G. Fleming, *Supt*...............Savannah, Ga.
F. S. Pendergast, *Ch. Eng*........Savannah, Ga.
A. A. Aveilhé, *Pur. Agt*..........Savannah, Ga.
G. M. D. Riley, *M. of Mach*......Savannah, Ga.
E. Giffken, *For. Car Dept*........Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.).*
Savannah, Skiddaway & Seaboard R. R.
5 g. 12 m. 3 lo. 12 cars.
Edward J. Thomas, *Supt*........Savannah, Ga.
R. F. Brown, *M. M*...............Savannah, Ga.
G. W. Mattan, *M. C. B*...........Savannah, Ga.
Schuylkill & Lehigh R. R. (*See Phil & Read.*)
Scoharie Valley R. R. (*See Middleburg & Sch.*)

Scioto Valley R. R. 4-8¾ g. 132 m. 17 lo. 548 cars.
Geo. Skinner, *Supt. & P. Agt*.....Columbus, O.
R. Bromley, *M. M*..................Portsmouth, O.
Seaboard & Roanoke R. R. 4-8½ g. 80 m. 21 lo. 384 c.
E. G. Ghio, *Mast. of Trans*....Portsmouth, Va.
J. A. Walton, *Pur. Agt*..........Portsmouth, Va.
M. M. Pendleton, *S. M. P. & M.* Portsmouth, Va.
Sedalia, Warsaw & Southern Ry. (*See Mo. Pac.*)
Sharpsville R. R. 4-8½ g. 23 m. 3 lo. 13 cars.
Walter Pierce, *Gen. Man*.......Sharpsville, Pa.
Shenandoah Valley R. R. 4-9 g. 249 m. 32 lo. 849 c.
Norfolk & Western R. R. 5 g. 486 m. 82 lo. 1,779 c.
J. H. Sands, *Gen. Supt*..............Roanoke, Va.
W. C. De Armond, *Pur. Agt*..Philadelphia, Pa.
Chas. Blackwell, *Supt. of M. P*...Roanoke, Va.
Sh. Val. Rd.: D. W. Flickwir, *Supt*., Roanoke, Va.
N. & W.; W. Div.: Frank Huger, *Supt.*; and
N. & W.; E. Div.: N. M. Osborne, *Supt.*; and
J. T. Robinett, *M. M*..............Petersburg, Va.
Shenango & Allegheny R.R. 4-9½ g. 57 m. 8 lo. 248 c.
J. T. Blair, *G. Man. & Pur. Agt.* Greenville, Pa.
Edw. Richardson, *M. M. & C. B.* Greenville, Pa.
Shepaug R. R. 4-8½ g. 38 m. 3 lo. 28 cars.
Edwin McNeill, *Supt*................Litchfield, Ct.
F. J. Broughet, *M. M*..............Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt*....Ripley, Miss.
W. H. Phelps, *M. M*....................Ripley, Miss.
Silver City, Deming & Pacific R. R. 3 g. 47 m. 3 l. 141 c.
John W. Smith, *Gen. Supt*....Silver City, N. M.
Silver Lake Ry. 4-8½ g. 6 m. 1 lo. 4 cars.
S. L. Chapin, *Supt*.......................Perry, N. Y.
Sinaloa & Durango R. R. 4-8½ g. 38 m. 2 lo. 40 cars.
Geo. S. Skilton, *Supt*......Altata, Sinaloa, Mex.
John E. Bell, *M. M*.................Culiacan, Mex.
Skaneateles R. R. 4-8½ g. 5 m. 2 lo. 5 cars.
J. McNamara, *Supt*..........Skaneateles, N. Y.
Sioux City & Pacific R. R. 4-8½ g. 427 m. 28 lo. 785 c.
P. E. Hall, *Gen. Man. & P. A.* Cedar Rapids, Ia.
C. M. Lawler, *Gen. Supt*....Missouri Valley, Ia.
J. S. Wattles, *Supt*..........Missouri Valley, Ia.
C. F. McCoy, *Asst. Supt*.....................Blair, Neb.
S. A. Teal, *M. M*..............Missouri Valley, Ia.
W. H. Ramseyer, *M. C. B*...Missouri Valley, Ia.
Smyrna & Delaware Bay R. R. (*See Kent County.*)
Sodus Bay & Southern Ry. 4-8½ g. 34 m. 4 lo. 40 c.
G. H. Stearns, *Gen. Man*...Sodus Point, N. Y.
G. H. Stearns, *Supt. & Pur. Agt.* Sodus Point, N. Y.
F. H. Garlock, *M. M*..........Sodus Point, N. Y.
C. H. Hill, *M. C. B*...........Sodus Point, N. Y.
Somerset R. R. 4-8½ g. 25 m. 3 lo. 24 cars.
W. M. Ayer, *Supt. & Pur. Agt.* W. Waterville, Me.
C. Crowell, *M. C. B*................No. Anson, Me.
Somerset & Cambria R. R. (*See B. & O.*)
Sonora Ry. (*See A., T. & S. Fe.*)
South & North Alabama R. R. (*See Louis. & Nash.*)
South Carolina Ry. 5 g. 246 m. 42 lo. 742 cars.
John B. Peck, *Gen. Man*........Charleston, S. C.
S. B. Pickens, *Pur. Agt*........Charleston, S. C.
P. J. Cochrane, *Mast. of Mach.* Charleston, S. C.
Geo. H. Gramling, *M. C. B*....Charleston, S. C.
South-Eastern Ry. 4-8½ g. 280 m. 30 lo. 1,000 cars.
T. A. McKinnon, *Gen. Man*.....Montreal, Can.
A. G. Eastman, *M. M*...............Farnham, P. Q.
South Florida R. R. 3 gauge 40 m. 5 lo. 53 cars.
B. R. Swoope, *Supt. & P. A*.......Sanford, Fla.
C. C. Haskell, *Pur. Agt*............Sanford, Fla.
J. A. Campbell, *M. M*..............Sanford, Fla.
A. D. Stentiford, *M. C. B*..........Sanford, Fla.
South Mountain R. R. 4-8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt.* Pine G've Furnace, Pa.
South Pacific Coast R. R. 3 g. 81 m. 14 lo. 500 cars.
Gen. Supt.....San Francisco, Cal.
G. H. Waggoner, *Pur. Agt*..San Francisco, Cal.
E. L. Reese, *M. M. & C. B*.........Newark, Cal.
South-Western R. R. (Ga.) (*See Central of Ga.*)
South-Western Ry. (Ky.) 4-8½ g. 4 m. 1 lo. 38 cars.
J. M. Wilson, *Supt*...............Harrodsburg, Ky.
J. Tomlinson, *Pur. Agt*.......Harrodsburg, Ky.
Southern Central R. R. 4-8½ g. 156 m. 21 lo. 467 c.
James G. Knapp, *Supt. & Pur. Agt.* Auburn, N. Y.
Chas. G. Brown, *M. M*.................Auburn, N. Y.
H. Mooney, *M. C. B*....................Auburn, N. Y.
Southern Kansas Ry. (*See At., Top. & Santa Fe.*)
Southern Maryland R. R. 4-8½ g. 20 m. 1 lo. 20 c.
Robert Knight, *Supt*............Brandywine, Md.
C. R. Joyce, *M. M*..............Brandywine, Md.
Southern Pacific R. R. 4-8½ g. 198 m. 30 lo. 728 c.
Northern Div. (*For other Divs. see Cen. Pac.*)
A. C. Bassett, *Supt*.......San Francisco, Cal.
J. R. Watson, *Pur. Agt*.......Sacramento, Cal.
J. T. Wilson, *M. M*..........San Francisco, Cal.
F. N. Bellisle, *M. C. B*.....San Francisco, Cal.
Southern Pacific R. R. of Arizona. (*See Cen. Pac.*)
Southern Pacific R. R. of New Mexico. (*See Cen. Pac.*)
Spartanburg, Union & Columbia R. R.
(*See Rich. & Dan.; (3) Div.*)
Spring Brook R. R. 4-3 g. 8 m. 1 lo. 18 cars.
Charles Pugh, *Pres*......................Pittston, Pa.
Spring Hill & Parrsboro Ry. (*See Cumberland.*)
Springfield, Effingham & So.-E'n Ry. (*See Ind. & Ill.*)
Springville & Sardinia Ry. 4-8½ g. 12 m. 1 lo. 8 c.
Bertrand Chaffee, *Pres*..........Springville, N. Y.
St. Croix & Penobscot R. R. 4-8½ g. 22 m. 4 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt*..Calais, Me.
G. H. Corsen, *M. M*..................Milltown, Me.
H. C. Tincker, *M. C. B*..............Milltown, Me.
St. John & Maine Ry. (*See New Brunswick.*)
St. John's Ry. 4-8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin, *Pr. & Supt*..Jacksonville, Fla.
Geo. Ferro, *M. of Mach*.....................Tocoi, Fla.
St. John's & Lake Eustis Ry. 3 g. 36 m.
W. J. Jarvis, *Supt*.....................Ft. Mason, Fla.
St. Johnsb'ry & Lake Champ. 4-8½ g. 120 m. 10 lo. 372 c.
A. B. Jewett, *Supt. & P. A*..St. Johnsbury, Vt.
Geo. E. Howe, *M. M. & C. B.* St. Johnsbury, Vt.
St. Joseph Valley R. R. 3 g. 15 m. 1 lo. 11 cars.
E. T. Chase, *Gen. Man*...Berrien Springs, Mich.
St. Joseph & Des Loge Ry. 3 g. 13 m. 4 lo. 70 cars.
T. T. Onderdonk, *Supt*.......Bonne Terre, Mo.
St. Joseph & Western R. R. (*See Union Pac.; (1) Div.*)
St. Joseph & Des Moines R. R. (*See K. C., St. J. & C. B.*)
St. Lawrence & Ottawa Ry. (*See Can. Pac.*)
St. Louis, Alton & Terre Haute R. R.
Main Line. (*See C., C., C. & I.; Ind. & St. L. Div.*)
St. Louis & Cairo Div.: 4-8½ g. 137 m. 17 lo. 800 c.
G. W. Parker, *Gen. Man*.........St. Louis, Mo.
J. L. Hinckley, *Supt*..............Belleville, Ill.
A. M. De Clerq, *M. M*............St. Louis, Mo.
St. Louis Bridge Co. and Tunnel R. R.
4-8½ g. 31 m. 22 lo. 11 cars.
Wm. Taussig, *Gen. Man*............St. Louis, Mo.
A. W. Dickinson, *Supt*.............St. Louis, Mo.
J. E. Williams, Jr., *Pur. Agt*....St. Louis, Mo.
H. M. Smith, *M. M*..................St. Louis, Mo.
St. Louis Coal R. R. 4-8½ g. 93 m. 10 lo. 217 cars.
Jas. Prentice, *Supt*................Carbondale, Ill.
Jas. C. Bryden, *Pur. Agt*.........St. Louis, Mo.
St. Louis, Des Moines & Northern Ry. 4-8½ g. 43 m.
C. F. Merk, *Supt*...................Des Moines, Ia.
St. L., Ft. Scott & Wichita R.R. 4-8½ g. 160 m. 6 l. 337 c.
J. W. Miller, *V. P. & Gen. Man*..Fort Scott, Kan.
Tho. N. Lewis, *Asst. Supt*......Fort Scott, Kan.
Tho. N. Lewis, *Pur. Agt*.......Fort Scott, Kan.
Henry Berger, *M. M*..................Ft. Scott, Kan.
A. A. Liddell, *M. C. B*...............Ft. Scott, Kan.
St. L., Hannibal & Keokuk. 4-8½ g. 85 m. 5 lo. 70 c.
W. W. Walker, *Gen. Supt*..........Hannibal, Mo.
Geo. Douglass, *Pur. Agt*...........Hannibal, Mo.
St. Louis, Iron Mt. & So'n Ry. (*See Mo. Pac.; (4) Div.*)
St. L., Keokuk & No.-W'n. Ry. (*See C., B. & Q.*)
St. L., Salem & Little Rock. 4-9 g. 72 m. 5 lo. 111 c.
H. A. Crawford, *V. Pr. & P. A*...St. Louis, Mo.
E. B. Sankey, *Supt*.........................Salem, Mo.
Thomas Everson, *M. M*..............Steelville, Mo.
J. W. Houston, *M. C. B*.............Steelville, Mo.
St. Louis & Cairo R. R. 3 g. 152 m. 22 lo. 896 cars.
Chas. Hamilton, *Gen. Supt*........St. Louis, Mo.
R. M. Pringle, *M. M*...................St. Louis, Mo.
St. L. & San Fran. Ry. 4-8½ g. 902 m. 88 lo. 3,000 c.
C. W. Rogers, *V. P. & Gen. Man*..St. Louis, Mo.
D. H. Nichols, *Mast. Tran*..No. Springfield, Mo.
A. G. Thompson, *Pur. Agt*..........St. Louis, Mo.
M. Kearney, *M. M. & C. B*..No. Springfield, Mo.
East Div.: A. Veech, *Supt*..........St. Louis, Mo.
Central Div.: W. A. Thoms, *Supt*..Springfield, Mo.
Kan. Div.: J. R. Wentworth, *Supt.* Neodesha, Kan.
St. Martin's & Upham Ry. 4-8½ g. 30 m. 2 lo. 8 cars.
A. E. Killam, *Manager*..........St. Martin's, N. B.

St. Paul, Minneapolis & Manitoba Ry.
4-8½ g. 1,402 m. 201 lo. 5,068 cars.
A. Manvel, Gen. Man.............St. Paul, Minn.
E. B. Wakeman, Asst.Gen.Supt.St. Paul, Minn.
J. C. Morrison, Pur. Agt........St. Paul, Minn.
H. Middleton, M. M. & C. B ....St. Paul, Minn.
Breck. Div.: W. S. Kemp, Supt...St. Paul, Minn.
F. F. Div.: J. B. Rice, Supt........St. Paul, Minn.
No'n Div.: A. Guthrie, Supt.....Crookston, Minn.
St. Paul & Duluth R. R. 4-8½ g. 225 m. 37 lo. 1,080 c.
H. P. Breed, Gen. Supt..........St. Paul, Minn.
J. G. Callahan, Pur. Agt........St. Paul, Minn.
W. McFarland, M. M............St. Paul, Minn.
John Hill, M. C. B. ....St. Paul, Minn.
State Line & Sullivan R. R. 4-8½ g. 25 m. 3 lo. 263 c.
I. O. Blight, Supt.................Towanda, Pa.
Staten Island R. R. 4-8½ g. 13 m. 4 lo. 18 c.
J. W. Wilbur, Supt.............New York, N. Y.
Stony Clove & Catskill Mountain R. R.
3 g. 14 m. 2 lo. 22 cars.
Geo. Coykendall, Gen. Supt....Rondout, N. Y.
Stony Creek R. R. 4-8½ g. 11 m.
Geo. B. Boggs, Supt .... Norristown, Pa.
Sterling Mountain Ry. 6 g. 8 m. 2 lo. 145 cars.
J. C. Missimer, Supt..........Sloatsburg, N. Y.
Suffolk Lumber R. R. 3 g. 15 m. 3 lo. 41 cars.
W. M. Whaley, Supt.. ....Suffolk, Va.
Summit Branch R. R. 4-9 g. 20 m. 7 lo. 10 cars.
Thomas Gucker, Supt ....Williamsport, Pa.
Susquehanna & Delaware River R. R. In progress.
D. Y. Kilgore, Pres...........Philadelphia, Pa.
Sussex R. R. (See Del., Lack. & West.)
Syracuse, Binghamton & N. Y. R. R. (See D. L. & W.)
Syr., Ontario & N. Y. R. R. (See N. Y., W. Sh. & Buf.)
Syracuse, Geneva & Corning; Corning, Cowanasque & Antrim R. Rs. 4-8½ g. 142 m. 28 lo. 1,044 c.
A. H. Gorton, Supt...........Corning, N. Y.
W. E. Gorton, Asst. Supt.........Corning, N. Y.
Andrew Beers, Pur. Agt.. .....Corning, N. Y.
O. C. Patchell, M. M.............Corning, N. Y.
C. J. Butler, M. C. B.............Corning, N. Y.

T

Tawas & Bay County R. R. 3-2 g. 28 m. 2 lo. 100 c.
Henry Clark, Gen. Supt......Tawas City, Mich.
Tennessee Coal R. R. 5 g. 28 m. 8 lo. 204 cars.
A. M. Shook, Gen. Man......Tracy City, Tenn.
W. A. Knight, M. M......... Tracy City, Tenn.
Tennessee & Sequatchee Valley R. R.
3 g. 42 m. 1 lo. 24 cars.
Chas. Clinton, Gen. Supt....Spring City, Tenn.
P. V. Mooney, Pur. Agt......Spring City, Tenn.
Terre Haute & Indianapolis R. R.
4-9 g. 398 m. 105 lo. 4,170 cars.
Joseph Hill, Gen. Supt.... ....St. Louis, Mo.
C. R. Peddle, P. Agt........Terre Haute, Ind.
Geo. H. Prescott, S. M. P. & M. Terre Haute, Ind.
E. D. Carter, M. C. B ......Terre Haute, Ind.
Chas. Butler, M. M..............Effingham, Ill.
Clinton Idler, Foreman ... Indianapolis, Ind.
Terre Haute & So.-Eastern Ry. 4-9 g. 44 m. 2 lo. 145 c.
Geo. Atherton, Supt......... Terre Haute, Ind.
Texas Central Ry. (See Hous. & Tex. Cen.)
Texas-Mexican Ry. (See Mex. Nat.)
Texas Trunk R. R. 4-8½ g. 36 m. 2 lo. 8 cars.
Hugh Irwin, Gen. Supt.........Dallas, Tex.
Texas Western Ry. 3 g. 52 m. 2 lo. 44 cars.
E. L. Heriot, Gen. Man. ....Houston, Tex.
Henry Hatch, Gen. Supt ....Houston, Tex.
T. F. Glispin, M. M..............Houston, Tex.
Texas & N. O. R. R. (See Cen. Pac.; G. H. & S. A. Div.)
Texas & Pacific. (See Mo. Pac. Ry.; (6) Div.)
Texas & St. Louis Ry. 3 g. 769 m. 84 lo. 2,000 cars.
W. R. Woodard, Rec.............St. Louis, Mo.
F. W. Paramore, Pur. Agt ..... St. Louis, Mo.
G. W. Prescott, S. M. P. & M ...St. Louis, Mo.
A. E. Buchanan, Supt..........Pine Bluff, Ark.
Tex. Div.: J. T. Gerry, Supt. ....Tyler, Tex.
Tionesta Valley R. R. 3 g. 15 m
George Dickinson, Gen. Supt .... Sheffield, Pa.
Tioga R. R. 4-8½ and 6 g. 67 m. 18 lo. 960 cars.
R. Dupuy, Supt.... ....Blossburg, Pa.
J. C. Guthrie, Pur. Agt.. ....New York, N. Y.
Pere Bonny, M. M...............Blossburg, Pa.
D. H. Stratton, M. C. B...... .Blossburg, Pa.
Toledo, Ann Ar. & Gr. Tr. Ry. 4-8½ g. 63 m. 9 lo. 186 c.
J. M. Ashley, Gen. Man......Ann Arbor, Mich.
H. W. Ashley, Supt. & Pur. Agt. do
C. C. Dodge, M. M...........Ann Arbor, Mich.
Toledo, Cin. & St. Louis R. R. 3 g. 798 m. 101 lo. 3,500 c.
E. P. Murray, Gen. Supt.... ....Toledo, O.
F. W. Stewart, P. Agt.................Toledo, O.
L. W. James, Supt. Mach....... ..Delphos, O.
Toledo Div.: W. H. Vandergrift, Supt.; do
Thos. Robertson, M. M..... .....Delphos, O.
J. S. Wiers, M. C. B..............Delphos, O.
Del. & Cin. Divs.: C. A. Bell, Supt........Cin., O.
T. J. Hamer, M. M ....Cincinnati, O.
So. D. & E. Div.: W. W. Cummings...Dayton, O.
W. H. Anderson, M. M...........Dayton, O.
St. Louis Div.: Frank F. Allen....Charleston, Ill.
P. H. Murphy, M. M ....Charleston, Ill.
Ironton Div.: C. C. Clark, Supt ....Ironton, O.
Toledo & Indianapolis R. R. 4-8½ g. 43 m. 4 lo. 118 c.
M. Clark, Supt.... .... .Toledo, O.
H. M. Swan, M. M. ....Toledo, O.
Toledo & South Haven R. R. (See Paw Paw.)
Tonawanda Val. & Cuba R. R. (See Brad., B. & K.)
Toronto, Grey & Bruce Ry. 4-8½ g. 191 m. 28 l. 446 c.
Edmund Wragge, Gen. Man... .Toronto, Can.
W. Watson, Pur. Agt .... Toronto, Can.
David Preston, M. M............ Toronto, Can.
Toronto & Nipissing Ry. (See Mid. Ry. of Can.)
Troy & Boston R. R. 4-8½ g. 48 m. 20 lo. 484 cars.
D. Robinson, Pres. & Pur. Agt......Troy, N. Y.
Joseph Crandell, Supt. .... Troy, N. Y.
Z. B. Davis, M. M ....Troy, N. Y.
R. V. Coon, M. C. B.................Troy, N. Y.
Troy & Greenfield R. R. & H. Tunnel. 4-8½ g. 44 m.
A. W. Locke, Man..........North Adams, Mass.
Tuckerton R. R. 4-9 g. 31 m. 2 lo. 29 cars.
J. J. Pharo, Supt. & Pur. Agt. Tuckerton, N. J.

U

Ulster & Delaware R. R. 4-8½ g. 74 m. 10 lo. 214 cars.
Jas. H. Jones, Supt...............Rondout, N. Y.
Joseph Rush, M. M ....Rondout, N. Y.
John H. Decker, M. C. B.........Rondout, N. Y.
Union Pacific Ry. (7 Gen. Divs.),
3 & 4-8½ g. 4,633 m. 510 lo. 10,550 cars.
S. H. H. Clark, Gen. Man.........Omaha, Neb.
Thos. L. Kimball, Asst. Gen Man. Omaha, Neb.
M. H. Goble, Pur. Agt.............Omaha, Neb.
I. H. Congdon, S. M. P. & C. D...Omaha, Neb
John Wilson, Asst. do...............Omaha, Neb.
(1) Neb. Div.: P. J. Nichols, Gen. Supt..Omaha, Neb.
E. Div.: C. B. Havens, Supt.. .....Omaha, N. B.
R. McConnell, M. M........... Omaha, Neb.
A. M. Collett, M. C. B...........Omaha, Neb.
E. Sleppy, M. M...............G. Island, Neb.
L. Pole Div.: W. A. Deuel, Supt. .Cheyenne, W. T.
J. H. McConnell, M. M. .. ..N. Platte, Neb.
R. McDougall, M. M..........Cheyenne, W. T.
(2) Wy. Div.: E. Dickenson, Gen. Supt. .Laramie, W. T.
T. E. Lewis, M. M. ....Laramie, W. T.
T. A. Davis, M. M ....Rawlins, W. T.
Wes. Div.: C. E. Wurtelle, Supt. Evanston, W. T.
Geo. F. Chapman, M. M......Evanston, W. T.
(3) Idaho Div.: W. B. Doddridge, Gen. Supt. Ogden, U.
F. Rearden, M. M... .... Pocatello, Id.
Ogden Short Line Div.:
R. Blickensderfer, Supt.... .. Pocatello, Id.
Utah & Northern Div.:
W. P. P. St. Clair, Supt... ...Eagle Rock, Id.
W. J. Hemphill, M. M...... Eagle Rock, Id.
W. J. Hemphill, M. M. ....Eagle Rock, Id.
J. W. Paul, Gen. For. C. D.. .Eagle Rock, Id.
(4) Col. Cent. Div.: A. A. Egbert, Gen. Supt. Denver, Col.
F. Meirtsheimer, M. M ....Denver, Col.
C. C. Div.: P. Touhy, Supt..........Denver, Col.
So. Park Div.: D. K. Sweet, A. Supt. .Como, Col.
(5) Kan. Div.: S. T. Smith, G. Supt..Kansas City, Mo.
K. Val. Div.: J. O. Brinkerhoff, Supt. Kan. C'y, Mo.
Jas. Mackenzie, M. M .... Armstrong, Kan.
Kansas Central Div.:
W. T. Kelley, Supt..... ..Leavenworth, Kan.
Smoky Hill Div.:
O. H. Dorance, Supt...........Wallace, Kan.
J. B. Dailey, M. M. ....Ellis, Kan.
(6 Salt Lake & Western Div.:
W. W. Ritter, Supt.....Salt Lake City, Utah.
(7) Nevada Central Ry. 3 g. 93 m. 4 lo. 78 cars.
F. W. Dunn, Gen. Supt. & P. A. Battle Mt., Nev.
Z. T. Sprigg, M. M........Battle Mountain, Nev.
United States Rolling Stock Co. 19 lo. 4,692 cars.
A. Hegewisch, Pres............New York, N. Y.
W. H. Chaddock, Gen. Agt.........Chicago, Ill.
Upson County R. R. (See Central of Ga.)
Utah Central Ry. 4-8½ g. 280 m. 21 lo. 358 cars.
John Sharp, Gen. Supt...Salt Lake City, Utah.
S. H. Hill, Pur. Agt.......Salt Lake City, Utah.
Geo. G. Bywater, M. M..Salt Lake City, Utah
Peter Reid, M. C. B.......Salt Lake City, Utah.
Utah & Nevada Ry. 3 g. 37 m. 3 lo. 33 cars.
W. W. Ritter, Gen. Man...Salt Lake City, Utah.
Robert Anderson, M. M...Salt Lake City, Utah.
Utah & Northern Ry. (See Union Pac.; (3) Div.)
Utah & Pleasant Valley Ry. (See Den. & Rio. Gr.)
Utica, Ithaca & Elmira Ry. 4-8½ g. 120 m. 11 lo. 152 c.
Geo. S. Sadler, Supt ....Elmira, N. Y.
Edw. Mahler, Pur. Agt...........Elmira, N. Y.
C. J. Howe, M. M. & M. C. B..Breesport, N. Y.
Utica, & Black Riv. R. R. 4-8½ g. 180 m. 22 lo. 452 c.
J. F. Maynard, Gen. Supt. & P. A..Utica, N. Y.
John Bailey, M. M.................Utica, N. Y.
David James, M. C. B..............Utica, N. Y.

V

Vaca Vall. & Clear Lake R. R. 4-8½ g. 30 m. 2 lo. 19 c.,
G. B. Stevenson, Gen. Supt... ..Vacaville, Cal.
Valley Ry. (Ohio) 4-8¾ g. 85 m. 15 lo. 581 cars.
J. E. Turk, Supt. & P. Agt........Cleveland, O.
Chas. Blanchard, M. C. B..... ..Cleveland, O.
Valley R. R. Va. 4-8½ g. 62 m.
S. Spencer, Pres.. ....Baltimore, Md.
Vermont Valley R. R. (See Conn. River.)
Vicksburg & Brunswick R. R. (See Cen. of Ga.)
Vicksburg & Meridian R. R. (See Cin., N. O. & Tex. Pac.)
Vicks. Shreveport & Pac. R. R. (See C., N. O. & T. P.)
Victoria Ry. (See Midland Ry. of Can.)
Virginia Midland Ry. (See Rich. & Dan.; (4) Div.)
Virginia & Truckee R. R. 4-8½ g. 54 m. 17 lo. 375 c.
Carson & Colorado R. R. 3 g. 234 m. 6 lo. 134 c.
H. M. Yerington, Gen. Supt... .. Carson, Nev.
R. J. Laws, Supt. (C. & Col.)..Hawthorne, Nev.
Hume Yerington, Pur. Agt........Carson, Nev.
I. N. Fording, M. M.. ....Carson, Nev.
M. M. Hyde, M. C. B.... .... Carson, Nev.

W

Wabash, Chester & W'n R. R. (See St. Louis Coal.)
Wabash, St. Louis & Pacific Ry. (4 Gen. Divs.,
4-8½ g. 3,241 m. 598 lo. 17,230 cars.
John C. Gault, 2d V. P...........St. Louis, Mo.
Robert Andrews, Gen. Supt.. ..St. Louis, Mo.
R. B. Lyle, Pur. Agt.............St. Louis, Mo.
Jacob Johann, Gen. M. M......Springfield, Ill.
U. H. Kohler, Gen. M. C. B...........Toledo, O.
(1) Eas'n Div.: G. W. Stevens, Supt........Peru, Ind.
J. B. Barnes, M. M.........Fort Wayne, Ind.
John McKenna, M. M............. Peru, Ind.
Cairo Div.: D. G. Moore, Asst. Supt....Cairo, Ill.
W. S. Morris, M. M.................Carmi, Ill
Rant'l Div.: B. F. Mathias, Asst. Supt. Rantoul, Ill.
J. McCarthy, M. M..................Rantoul, Ill
(2) Middle Div.: H. F. Clark, Supt....Springfield, Ill.
B. B. Rose, M. C. B...............Decatur, Ill.
F. L. Tomkins, Asst. Supt. ....Forest, Ill.
F. D. Schermerhorn, Asst. Supt.. Quincy, Ill.
(3) Northern Div.: E. N. Armstrong, Supt. Peoria, Ill.
C. S. Lape, M. M.......... ....Tilton, Ill.
R. M. Hemphill, M. C. B...........Peoria, Ill.
E. B. Hyde, Asst. Supt.......... Havana, Ill.
(4) Western Div.: R. S. Miner, Supt.....Moberly, Mo
W. H. Selby, M. M................Moberly, Mo.
C. S. Buck, M. C. B................Moberly, Mo.
E. Dresser, Asst. Supt...........Stanberry, Mo
J. S. Hazen, M. C. B.............Stanberry, Mo
D. Moin. Div.: C. F. Meek, A. Supt. Des Moines, Ia
Walden's Bridge R. R. 3 g. 23 m. 3 lo. 37 cars.
John G. Scott, Gen Man....Jenks P. O., Tenn.
Walkill Ry. (See N. Y., West. Sh. & Buf.)
Walla Walla & Columbia Riv. R. R. (See Ore. Ry.)
Walton R. R. 5 g. 10 m. 1 lo. 7 cars.
D. H. Walker, Pres.................Monroe, Ga.
Warren & Farnsworth Valley R. R.
3 g. 11 m. 3 lo. 39 cars.
A. D. Wood, Supt...................Warren, Pa.
Warwick Valley R. R. (See Leh. & Hud. River.)
Wasatch & Jordan Valley R. R. (See Den. & Rio. Gr.)
Washington, Ohio & West. R. R. 4-8½ g. 52 m. 5 lo. 87 c.
S. M. Brophy, Supt.... .... Alexandria Va.
Edward Dunn, M. M...........Alexandria, Va.
John Harrison, M. C. B........Alexandria, Va.
Waynesburg & Washington Rd. 3 g. 29 m. 3 lo. 26 c.
C. E. Bower, Supt..... ......Waynesburg, Pa.
A. M. Kline, M. C. B.... .....Waynesburg, Pa.
Welland Ry. 4-8½ g. 25 m. 4 lo. 147 cars.
William Pay, Supt.........St. Catharines, Ont.
Jas. Taylor, M. M... ......St. Catharines, Ont.
Wm. H. Pay, M. C. B......St. Catharines, Ont.
West End Narrow Gauge Ry. 3 g. 16 m. 3 lo. 13 c.
Rolla Wells, Supt............. . St. Louis, Mo.
M. M. Hodgman, M. M.........Florissant, Mo
West Feliciana R. R. 4-8½ g. 27 m. 2 lo. 22 cars
J. B. McGehee, Pr. & Gen. Supt. Bayou Sara, La.
J. A. Tilton, M. M. & C. B.....Bayou Sara, La
W. Va., Central & Pittsb'g Ry. 4-8½ g. 50 m. 4 lo. 119 c.
T. B. Davis, Gen. Man.......Piedmont, W. Va.
W. E. Porter, Gen. Supt......Piedmont, W. Va
Geo. W. Harrison, Pur. Agt...Piedmont, W. Va.
E. W. Lippencott, M. M.....Piedmont, W. Va.
West & East R. R. (See Ill. Cen.; N. O. Div.)
West Jersey R. R. (See Penn. R. R.; (3) Div.)
Western R. R. (of Ala.) 5 g. 85 m. 15 lo. 270 cars.
Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 240 c.
Cecil Gabbett, Gen. Man. & Supt...Mont., Ala.
C. D. Wall, M. M. & C. B ...Montgomery, Ala.
Western Counties' Ry. 4-8½ g. 67 m. 8 lo. 137 cars
J. Brignell, Supt. ....Yarmouth, N. S.
Western Maryland R. R. 4-8½ g. 157 m. 25 lo. 439 c
J. M. Hood, Pr. & Gen. Man....Baltimore, Md.
R. J. Adair, Pur. Agt........... Baltimore, Md.
David Holtz, Mast. of Mach..Union Bridge, Md.
J. H. Nussear, M. C. B.. ....Union Bridge, Md.
Western No. Carolina R. R. 5 g. 210 m. 17 lo. 160 c.
V. E. McBee, Supt..............Salisbury, N. C.
Jos. P. Minetree, Pur. Agt.......Richmond, Va.
G. W. Gates, M. M..... ....Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 58 lo. 952 c.
R. A. Anderson, Gen. Supt.........Atlanta, Ga.
A. B. Bostwick, Asst. Supt........ Atlanta, Ga.
John H. Flynn, M. M. & C. B.....Atlanta, Ga
Wheeling, Pittsburg & Baltimore R. R. (See B. & O.)
Wheeling & Lake Erie R. R. 267 m. 31 lo. 1,456 c.
M. D. Woodford, Gen. Man.........Toledo, O.
O. P. Dunbar, Gen. M. M...........Norwalk, O.
John Hillhouse, Div. M. M.........Norwalk, O.
A. Galloway, Div. M. M.........Cambridge, O.
Whitby, Port Perry & Lindsay Ry. (See Mid. of Can.)
White Water R. R. (See Ft. W., Cin. & Lou.)
Whitefield & Jefferson R. R. (See Bos., Con. & Mon.)
Whitneyville & Machiasport R. R. 8 m. 2 lo. 48 c.
C. Sullivan, G. M. & Pur. Agt. Whitneyville, Me.
Wicomico & Pocomoke R. R. 4-8½ g. 30 m. 2 lo. 38 c.
L. Showell, Pres................ ....Berlin, Md.
Williamsport & North Branch R. R.
4-8½ g. 9 m. 2 lo. 4 cars.
B. G. Welch, Man. & P. Agt...Hughesville, Pa.
J. V. Chamberlain, Supt. & M. M. do.
Williamstown & Del. River R. R.
4-8½ g. 9 m. 1 lo. 10 cars.
Samuel Garwood, Supt ...Williamstown, N. J.
Wilmington, Columbia & Augusta R. R. (See W. & W.)
Wilmington & No'n R. R. 4-8¾ g. 85 m. 16 lo. 148 c.
J. H. Thompson, Supt. & P. A. Coatesville, Pa
George Rommel, M. M ....Coatesville, Pa
Alex. Maitland, M. C. B..... ..Coatesville, Pa.
Wilmington & Weldon; Northeastern; S. C. Central; Cheraw & Darlington; Cheraw & Salisbury; and Wilmington, Columbia & Augusta R. Rs.
5 g. 599 miles 70 locomotives 1,120 cars.
R. R. Bridgers, Gen. Man....Wilmington, N. C.
J. F. Divine, Gen. Supt.......Wilmington, N. C.
John Bisset, M. M ....Wilmington, N. C.
W. H. Day, M. C. B...............Florence, S. C.
C. R. Clowe, M. C. B. (W. & W.). Wilmington, N. C.
Winifrede R. R. 4-9 g. 5 m. 1 lo. 65 cars.
Theodore Wright, Pres........Philadelphia, Pa.
Windsor & Annapolis Ry. 4-8½ g. 130 m. 10 lo. 160 c.
P. Innes, Gen. Man..............Kentville, N. S.
Wm. Yould, M. M.................Kentville, N. S.
Wm. Grierson, M. C. B......... ..Kentville, N. S.
Wisconsin Central R. R. 4-8½ g. 480 m. 49 lo. 1,800 c
F. N. Finney, Gen. Man.........Milwaukee, Wis.
E. K. Howes, Pur. Agt.........Milwaukee, Wis.
W. A. Short, Supt. M. P. & M...Stevens Pt., Wis.
Mil. & E'n Divs.: A. A. Allen, S..Milwaukee, Wis.
Wis., Minn. & S. M. & N. Div.:
W. E. Carroll, Supt.. ....Stevens Point, Wis.
Wisconsin, Iowa & Nebraska.
G. C. McMichael, Supt........Marshalltown, Ia.
Wisconsin & Michigan R. R. (See Mil. & North'n.)
Wisconsin & Minnesota R. R. (See Wis. Cen.)
Wood River Branch R. R. 4-8½ g. 6 m. 2 lo. 3 cars.
L. M. Barber, Supt............Hope Valley, R. I.
Woodstock R. R. 4-8½ g. 14 m. 1 lo. 3 cars.
J. G. Porter, Supt.................Woodstock, Vt.
Worcester R. R. (Md.) (See Del., Md. & Va.)
Worcester, Nashua & Rochester R. R.
4-8½ g. 95 m. 20 lo. 523 cars.
C. S. Turner, Pres. & G. Man. Worcester, Mass.
G. W. Hurlburt, Supt.........Worcester, Mass.
John G. Brady, M. M. & C. B. Worcester, Mass
Worcester & Shrewsbury R. R. 3 g. 3 m. 3 lo. 9 c.
J. J. Coburn, Supt........ ....Worcester, Mass.
G. E. Hapgood, Pur. Agt ...Worcester, Mass.
Chas. Cleveland, M. M ....Worcester, Mass.
Worcester & Somerset R. R. (See N. Y., Phil. & Nor.)

Y

York & Peach Bottom Ry. 3 g. 40 m. 4 lo. 74 c.
S. M. Manifold, Supt. & Pur. Agt.....York, Pa.
S. J. Williams, M. M........... ......York, Pa.
Youghiogheny R. R. 4-9 g. 12 m.
Wm. Wilson, Supt.......... ....Irwin's, Pa

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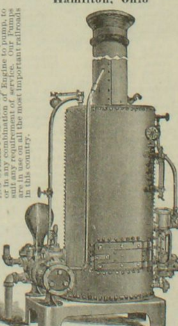
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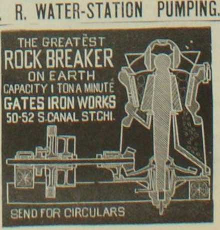

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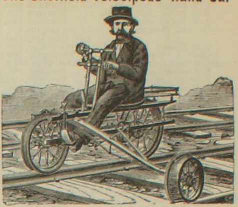
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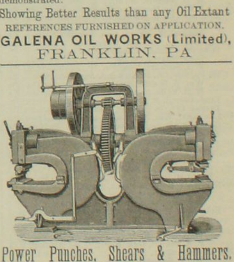
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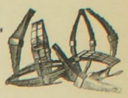

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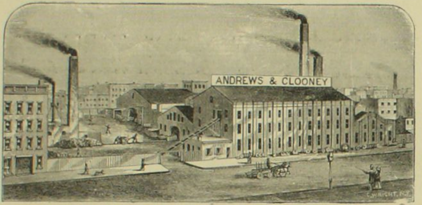

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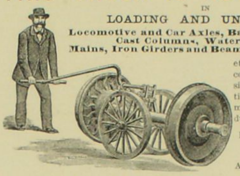

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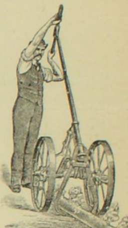

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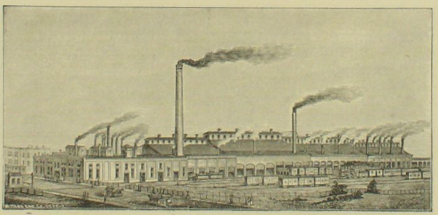

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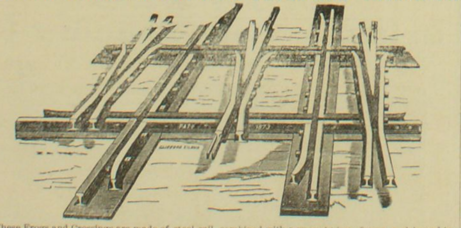

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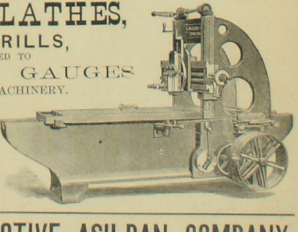

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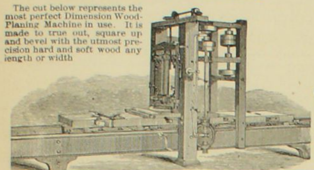

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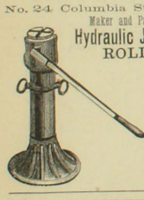

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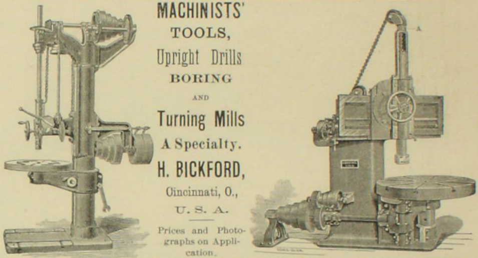

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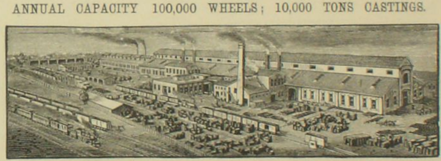

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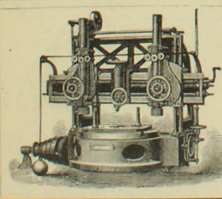

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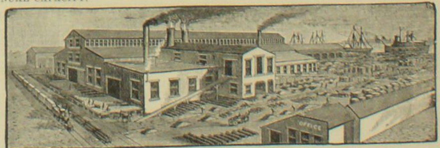

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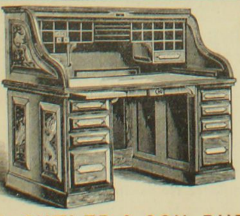

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